BOSTON SCHOOL KITCHEN TEXT-BOOK

LESSONS IN COOKING

For the Use of Classes in Public and Industrial Schools.

BY

MRS. MARY J. LINCOLN

LITTLE, BROWN & CO., PUBLISHERS
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BY

MARY J. LINCOLN,

AUTHOR OF

"THE BOSTON COOK BOOK," "CARVING AND SERVING," ETC

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This Book is Dedicated

TO

MRS. MARY HEMENWAY,

THE EARNEST AND GENEROUS FRIEND OF PRACTICAL EDUCATION.

M. J. L.

IT is the accepted educational doctrine that all matters for school instruction should be taught, so far as possible, in the light of first principles. The understanding is to be engaged and thought awakened. A memory laden with rules and precepts is not enough; nor is the faculty of imitation in itself worthy of much care in the direct cultivation of it. The best education embraces more and aims higher.

Therefore, if cooking is to have a place among school exercises, the text-book ought to be, not a cook-book, but a book giving the reasons for its directions, and connecting these reasons with first principles. Such a book this one appears to be. Its claim to the title Boston School Kitchen Text-Book is justified by the fact that the substance of all the lessons has been worked out in the cooking class-rooms or school kitchens connected with the Boston public schools. That this working out has been decidedly satisfactory I gladly testify.

EDWIN P. SEAVER,
Superintendent of the Boston Public Schools.

PREFACE.

IN the preparation of this book the aim has not been to furnish a complete cook-book, or to cater to the widely prevalent desire for new receipts and elaborate dishes; but rather to prepare such a study of food and explanation of general principles in connection with practical lessons in plain cooking as should be adapted to the use of classes in public and industrial schools.

There is a great lack of knowledge, even among experienced housekeepers, of the nature of food and its proper combinations, and much unwholesome cooking has been the result of this ignorance.

Much of the dislike which many girls have for cooking arises from their want of success, and the failure is ascribed to ill luck, poor material, incorrect receipts, or to any cause but the true one, — ignorance of first principles.

Cooking cannot be well done by guess-work. There is a right way and a wrong way, and the right way is usually the easier. To show this right way and the reason for it, has been our endeavor in preparing these lessons.

Beginners in the art should strive for a thorough understanding of the principles that underlie all culinary work. This is essential to success, both in the preparation of the simple food adapted to the daily table and in the intricate labor of the *chef* in charge of some grand entertainment.

Above all, our object has been to elevate this department of work; to show its bearing upon many vital questions; to impress upon girls that all work well done is honorable; and that it is as really a part of education to be able to blacken a stove, to scour a tin, or to prepare a tempting meal of wholesome food, as it is to be able to solve a problem in geometry, to learn a foreign language, to teach a school, to decorate a plaque, to make an elegant gown, or to interpret the melodies and harmonies of the great masters in music.

We have endeavored to show that there is something more in cooking than the mere putting of certain materials together for the gratification of the palate; that it is not all manual labor, but requires study, and that it ought not to be considered drudgery or done in a careless, slipshod, untidy fashion. And more than all else we have insisted that the health and comfort of the family depend upon the wholesome and economical preparation of the daily food.

It cannot be expected to make professional cooks in twenty lessons. But it is confidently believed that if school-girls once master the elementary principles which these lessons illustrate, they can, with practice at home, acquire a degree of skill sufficient to do all

that is necessary in plain family living. And when this foundation is secured and a respect for the work developed they can do more. They can take any reliable cooking formula and work it out unaided, and in time detect errors in proportions and invent new combinations.

Youth is the time to begin to acquire this, as well as other knowledge. Many a young housekeeper overwhelmed with responsibility regrets that her mother did not require her to learn these things in her girlhood. No matter how high her social position may be, no girl is sure of retaining it through life. Though in her youthful conceit she may boast of never scrubbing a floor, or washing a dish, and may think it commendable to be ignorant of the mysteries of the kitchen, the time may come when she will have harder work than this to do, and will be thankful if there is one thing she can do well, even if it be but the washing of dishes or the cooking of wholesome food.

And if her position should chance to be that of a director of such work, rather than a doer of it, this practical knowledge will be even more valuable. For those can direct best who can do best; and those can do best in any department of work who begin in early life and learn by experience much that can be learned in no other way.

If we can awaken in school-girls an enthusiasm for the performance of the common duties of life, an important part of our purpose will have been accomplished.

The author wishes to acknowledge her indebtedness to Miss A. M. Homans, at whose suggestion this manual was prepared; to Miss Hope, and other teachers in the Boston School Kitchens for their help in the practical working out of these lessons; and to Mrs. Richards, of the Institute of Technology, for her assistance in revising the scientific portion of the work.

MARY J. LINCOLN.

SUGGESTIONS TO TEACHERS ON THE MANAGEMENT OF CLASSES.

It is expected that all teachers in the cooking classes will have had a special normal training for the work; but even with such training a few suggestions from one who has had a large experience in both the practice and the teaching of cookery may be helpful.

No definite rules can be given that will apply to all schools. Teachers must govern the classes and adapt the instruction as circumstances require, but it is of the first importance that the order and discipline of the public schools should be maintained in the cooking classes. Pupils must be required to dress neatly and appropriately. A large apron or tire, a holder suspended by a tape from the belt, a hand-towel at the side, and a cap to cover the hair entirely, are necessary. Rings and bracelets should not be worn during the lesson.

Personal cleanliness must be insisted upon. Many people who consider themselves neat have objectionable habits, and a word of caution will be given against such as have been observed frequently in pupils. The hands and nails should be perfectly clean; wash the hands always before beginning work and as often during the lesson as there is need. Wiping them on the towel at the side will often be sufficient, and should always be done just before touching any food.

Never allow the pupils to use their handkerchiefs or their aprons in the place of a towel or a holder, or to work with sticky or floured fingers, or to rest their hands on their faces or hair, or to lick their fingers, or to use their handkerchiefs

without immediately wiping their fingers, or to taste with the mixing spoon without wiping it before using it again, or to use a hand-towel as a dish-towel, or the hand-basin for food, or to do anything that is not neat and cleanly. The only way to cure pupils of untidy habits is to be sure that your own example is perfect in that respect, then be watchful and let no fault, however trivial, pass unnoticed.

In classes of fifteen pupils, three may be housekeepers, and the cooking may be done by the remaining members working in groups of two, three, or four, according to the number in the class. The kitchen work may be divided among the three according to the rules for housekeepers. These duties may be shared in alternation, so that all the pupils may learn both the cooking and the kitchen work.

The pupils should do all the work of keeping the classroom in order, except the weekly scrubbing of the floor. The room should be left in perfect order at the close of every lesson. This part of the training should be considered of equal importance with the cooking and should never be slighted.

During the lesson the pupils should work under the direction of the teacher and not from the text-book. Let the principles be explained, the receipts be given orally, and then let each step of the work be done as directed by the teacher.

Endeavor to draw out what the pupils already know, and let them think for themselves rather than cram them with a multitude of facts. The pupils may study the text-book after the lesson, and prepare at home the dishes they have learned to make in the class, and at the next lesson report the result, that the teacher may keep a record of the work done at home.

Examine the classes frequently on the previous lessons. Do not allow them to repeat verbatim any of the text in the book, but question them in such a way that they may be taught the art of expression. The receipts should be mem-

orized, for the pupils should know how to prepare all the dishes in daily use without referring to a book.

It is advisable to follow the order of the lessons in the book as far as practicable, but sometimes changes must be made. Afternoon classes should take Lesson VI. before Lesson V., and XV. before XIV., in order to finish the work begun in the morning class, and to economize in the use of material. In the spring sessions it may be advisable to have the baking lessons come before the invalid cookery, and thus avoid the heat.

The amount of material used at each lesson will vary with the number in the class, and the teacher must use her own judgment as to how much to provide. As small an amount as will suffice for thorough instruction should be the rule always. Many of the receipts may be halved, but the majority of them are already as small as practicable, and they have purposely been made as economical as we can make them and have the result satisfactory. More dishes are given in some lessons than can be prepared in the school hour. The teacher will select such as are in season and are adapted to the class, not confining the instruction to the one dish that is being made, but leading the pupils to suggest other dishes that may be made after the same general rule.

Pupils should never be encouraged to think that any part of the preparation of food is disagreeable or unworthy of their best effort.

The teacher should keep in mind that the object of the lesson is not to prepare a certain amount of food to eat or to sell, but to develop the powers of the children, the mental with the manual, and not the one to the exclusion of the other; to teach them to work understandingly, so that by being trained in youth to do well and intelligently the common daily duties of the home, they may be better fitted for the arduous duties of mature life, and become better and more useful women.

RULES FOR HOUSEKEEPERS.

HOUSEKEEPER No. I.

A. M.

Get kindlings and coal.
Build the fire.
Regulate the dampers.
Empty ashes into sifter.
Brush the stove and under and around it.
Blacken the stove.
Light the fire.
Polish the stove.
Regulate the dampers.
Fill tea-kettle and reservoir with fresh water.
Wash hearth or zinc under the stove.
Wash cloth and put to dry.
Sift ashes.
Bring cinders to kitchen.
Collect soiled dishes from desks and take them to the sink.
Put clean dishes in their places.

P. M.

Regulate the fire.
Replenish kettles.
Empty kettles and copper boiler, and turn them over to dry.

HOUSEKEEPER No. II.

Dust the room thoroughly. Begin at one corner and take each article in turn as you come to it. Dust from the highest things to the lowest, taking up the dust in the cloth, not brushing it off on the floor. Shake the duster occasionally in a suitable place, and when through wash and hang it to dry. Use two or more cloths if needed.

Bring stores to teacher when directed.

Scrub dresser and teacher's desk.

Keep dresser in perfect order.

Wipe dishes if needed.

Sweep room at 11.40 and 3.40, beginning at one side and sweeping toward one place. Hold the broom close to the floor; sweep with short strokes, and let the broom take the dust along on the floor instead of tossing it into the air.

HOUSEKEEPER No. III.

Polish the boiler.

Clean knives and spoons in dresser drawer.

Wash and wipe dishes.

Wash dish-towels.

Scrub sink outside and inside with hot suds.

Wash cloth and hang it to dry.

RULES FOR CLEANING DISHES.

COLLECT the knives, forks, and spoons. Scrape the dishes, rinse the cups, and soak in cold water any dishes that have egg or dough adhering to them; pack them neatly where they are to be washed. Have the dish-pan half full of hot soapy water, and the drainer near. Wash the glass first, one piece at a time, and wipe instantly. Wash the silver, and wipe at once without rinsing. Then wash the china, taking the less soiled dishes first, — cups, saucers, pitchers, plates, etc. Place the dishes on the drainer so they may be scalded inside and outside. Scald with hot soapy water, and wipe immediately. Glass, silver, and in fact, all kinds of dishes look brighter and better if wiped from hot, slightly soapy water instead of clear water. But be careful not to leave the soap in the water. Use a soap strainer, or keep the soap in a cup and pour the water over it.

Steel knives and forks should never be placed in the dish-water. Keep them in the hand and wipe the handles with the dish-cloth, wash the blades, scour if needed, then wash again and wipe at once.

Be particular to wash bright tin ware in clean hot soapy water with as much care as if it were silver. Do not forget to clean the grooves and seams.

Greasy iron ware should be wiped out first with soft paper to absorb the grease, then washed in scalding hot suds and wiped dry, — not with the dish-cloth, but with a dry towel.

Lukewarm or greasy water, and wet wiping towels, or the dish-cloth used instead of the towel for wiping, should never under any circumstances be allowed in cleaning dishes.

When all are wiped, see that your hands are dry, then pack all things of a kind together and distribute to their places. Wash the basin, dipper, soap-dish, dish-pan, and sink with clean hot suds. Then take clean water and soap and wash the towels and cloths; rinse in cold water, wring them, shake them out thoroughly, and hang them up to dry, — in the sun, if possible. If the towels are only slightly wet, and not soiled, they must be washed in clear water just the same, and never allowed to dry with the dish-water or rinse-water in them.

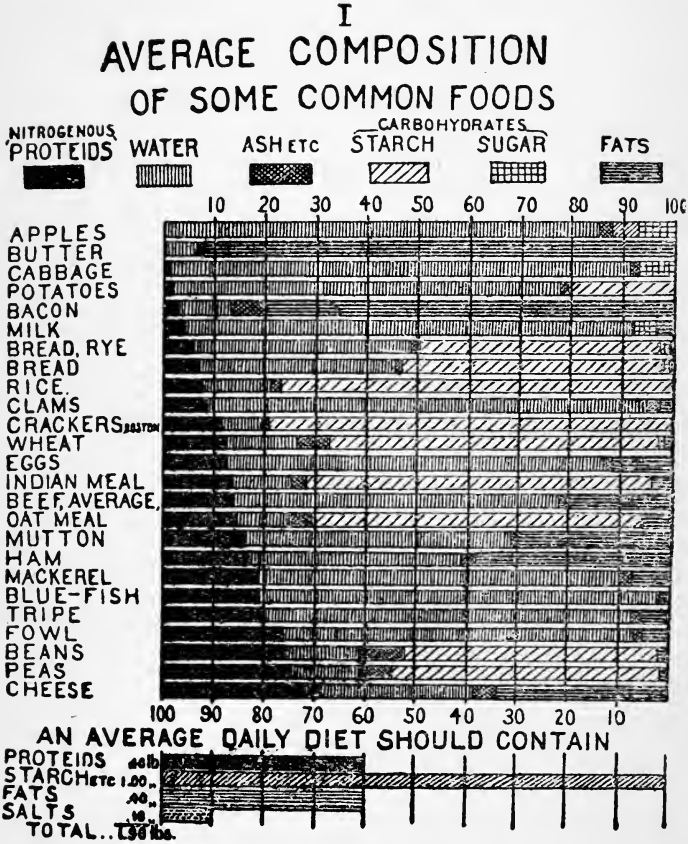
Tables and Bread Boards. — Scrape off the dough or brush off the crumbs, then dip a brush slightly in warm water, rub on sand soap, and rub hard with the brush, always with the grain of the wood, and hardest where there are grease spots. Do not let the water run off over the edge, but be careful to wash the edges. When clean, wash with a cloth in clear hot water, and when well rinsed off, rub dry. Wash out the cloth and brush, and leave the brush, bristles down, to dry. Always wash the bread board and meat board on the table where they have been used, never in an iron sink.

Tins. — Use a soft, damp cloth, and mineral soap or sapolio. Rub the tins quickly back and forth, the same way and not around. Wipe off all the sand, then wash quickly in clean hot soapy water, and wipe at once on a clean dry towel.

Brass, Copper, and Nickel Plate. — Moisten a soft woollen cloth with Pultz pomade, and rub briskly. Where the article to be rubbed is stationary, like a faucet, take an end of the cloth in each hand, bear down hard, and pull it briskly back and forth over the surface. The friction does the work more thoroughly than can be done by mere pressure with the hand. When bright, polish quickly with a dry clean flannel.

REDUCED COPY OF CHARTS

Prepared at the Massachusetts Institute of Technology by Professor Sedgwick and Mrs. Richards.



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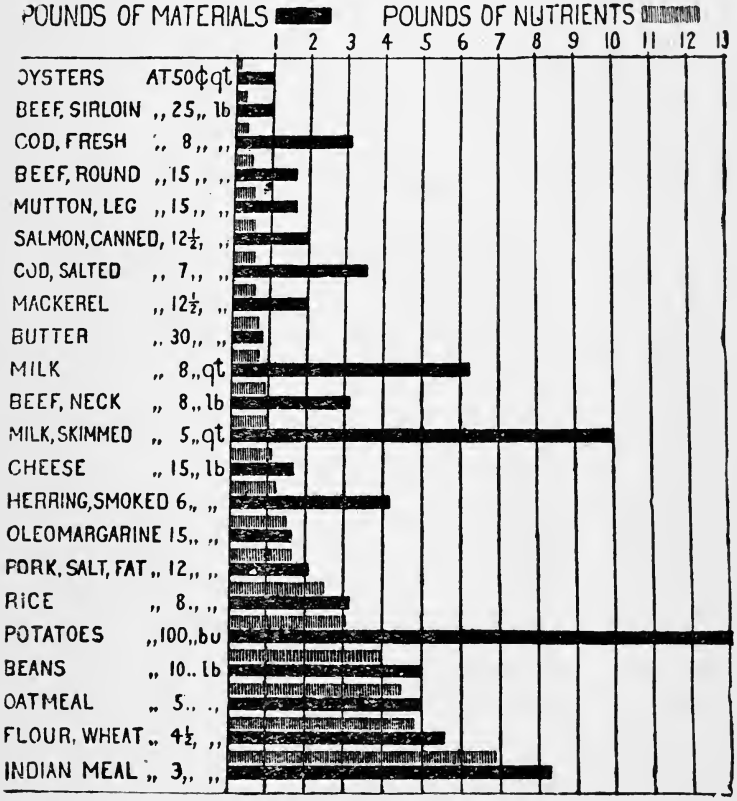
FOOD MATERIALS OBTAINED FOR 25¢



INTRODUCTORY.

In connection with the first and second lessons the pupils should learn about the four most important elements, namely, oxygen, nitrogen, hydrogen, and carbon.

OXYGEN.

Oxygen is a gas found as an element in the air and in combination everywhere. It is one fifth of the air, one half the solid crust of the earth, eight ninths of the water, about four fifths of the weight of vegetable bodies, and three fourths of the weight of animal bodies. It is the supporter of animal life; we are constantly taking it into our bodies and without it we should die. It sustains combustion and burns or unites with all other elements except fluorine. At a low temperature it unites slowly with iron, causing it to rust, and with wood, causing it to decay. It attacks all vegetable and animal substances and decomposes them, producing a form of oxidation or slow combustion. In every such chemical change heat is evolved, although it may not always be perceptible to our senses.

At a high temperature oxygen combines rapidly with some elements and produces fire or rapid combustion.

NITROGEN.

Nitrogen is a gas, and constitutes four fifths of atmospheric air. It is found in all vegetable substances, but chiefly in animal tissues. It forms about 26 per cent of the human

body. It dilutes the air and thus makes combustion less furious than it would be in oxygen alone and renders the air mild and suitable for us to breathe.

HYDROGEN.

Hydrogen is a gas, and is the lightest substance known.

It is seldom found free in nature, but its compounds are everywhere. Combined with oxygen it forms water. In this form it is found in all animal and vegetable substances. Pure hydrogen burns instantly in the air when lighted and produces intense heat, and the result of the burning is water-vapor.

CARBON.

Carbon is a solid elementary substance. Its combinations with other elements are in the form of liquids, gases, and solids.

It constitutes nearly one half of the weight of all dry vegetable and animal substances. It exists in a pure state in the diamond, and in a nearly pure state in charcoal and so-called black-lead or graphite. The charcoal that we burn, the graphite in our pencils, and the diamonds we wear are all different forms of the same element, carbon. The black mass left when bread is burned in the oven, or sugar on the stove, or fat in the frying-pan, is also carbon.

For further information the teacher is referred to "First Lessons on Minerals," by Mrs. Ellen H. Richards.

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BOSTON SCHOOL KITCHEN TEXT-BOOK.

LESSON I.

COOKING.

Cooking is the preparation of food, by the aid of heat, to nourish the human body. We cook our food to make it taste better, and that it may be more easily digested and made a part of our bodies.

The word "cooking" is derived from the Latin *coquo*, meaning "to boil, bake, seethe, dry, scorch, or ripen." Cooking is usually done by the application of heat. The ripening and the drying process, which some foods undergo by the direct heat of the sun, is a kind of natural cooking.

The heat of the living animal also does its part in preparing other varieties of food for our use; but the greater part of the food we eat is cooked or prepared by the more rapid action of artificial heat. This develops and improves the flavor, changes the odor, taste, and digestibility of nearly all articles of food, and thus renders them more capable of nourishing our bodies.

The proper cooking of much of our food depends also upon the use of water, or some other liquid, combined with heat, and upon the free action of air during the process of cooking.

HEAT.

Artificial heat for household purposes is obtained by rapid combustion, or the chemical union of the oxygen in the air with the carbon and hydrogen found in fuel.

Wood, charcoal, anthracite and bituminous coals, kerosene oil, and gas, all are composed of either carbon, or compounds of carbon with a gas, hydrogen, forming hydro-carbons. Sometimes they contain both.

All these varieties of fuel were originally derived from vegetable matter. The living tree or plant, through its leaves and roots, takes in from the air and soil carbonic acid gas and water with earthy and nitrogenous matter dissolved in the water. It gives back to the air a large part of the oxygen contained in the gas, but retains some of it, and especially retains much of the carbon and water. Upon these it lives, and from these, with the help of the sunlight, it constructs the woody fibre, sap, and other substances, — compounds which are rich in carbon. Since these compounds have been built up by the energy of the sunlight, and can unite with oxygen, they are readily combustible. When we burn them in the form of wood, oil, fat, etc., this energy is liberated, or set free, as heat, or light, or both. By heat, which represents a certain amount of energy, we are enabled to have work done: on a large scale, when we burn coal under an engine, and on a small scale when we burn it in our stoves, and use the heat to cook our food. Artificial heat may thus be traced to the sunlight, the chief source, also, of all natural heat.

FUEL.

Wood is a product of vegetable growth, found in the trunks and branches of trees. It contains hydro-carbons in a solid form. It consists of slender fibres or tubes closely packed together. When first formed these are hollow, and contain the sap or vegetable juices; but gradually they become hardened and consolidated, and by their successive layers or rings indicate the age of the tree.

The fibres in hard woods are more densely packed and are of a purer quality than those in soft woods. When freshly cut, wood contains a large amount of water or sap, and soft wood contains more than hard. On exposure to the air this water is lost by evaporation. Wood should be well dried to be useful and economical as fuel.

Charcoal is obtained by heating wood in close vessels, or in covered pits, with a limited supply of air, — enough to decompose the wood, but not enough to consume, or entirely burn it, — a kind of partial or half-smothered burning. The gaseous elements in the wood are all expelled, and the coal or charred wood that remains is nearly pure carbon.

Anthracite coal is 90 to 98 per cent carbon. It is found in immense layers, deeply embedded in various parts of the earth's crust. Ages ago the vast forests and luxuriant forms of vegetation were submerged; and by the action of pressure, heat, and other causes, they have been changed to their present form. The gaseous substances have nearly all been expelled, and the carbon that remains forms the hardest kind of coal.

Other forms of ancient vegetation thus buried had less

charring, and much of the hydrogen, or gaseous element, remains. These are called *bituminous coals*, from the bitumen or pitch which they contain.

Petroleum, from which kerosene oil is made, contains liquid compounds of hydrogen and carbon. It is obtained from wells in the bituminous coal regions.

Illuminating gas is made by distilling or heating bituminous coal with entire exclusion of air. *Coke* is the black, porous mass left after the volatile gases have been driven off, and is nearly pure carbon.

Carbon is the chief element in all these forms of fuel. In burning, the oxygen unites with the carbon and hydrogen, forming, with the carbon, carbonic acid gas, and with the hydrogen, watery vapor. Both escape into the air, and the gas is absorbed by plants. Some of the carbon is not consumed, and passes off as smoke.

Any fuel that burns with a flame must be at that moment in a gaseous state. In burning gas we simply have to heat the gas to its kindling-point, and we have a bright flame. We light the wick in a candle and at first it burns slowly; the wax in the wick must first melt, then change to a vapor, and when the vapor is heated to its kindling-point it burns with a flame. Wood burns with a flame because it is first decomposed by the heat. Gases are formed; and the burning of these gases, and not of the solid wood, produces the flame. Hard coal is made up almost entirely of solid carbon, which no furnace heat can change into gas. As there are no gases first made by the heat, so there can be no flame produced in the burning. Hard coal burns with a steady glow without flame, provided there is plenty of air to burn the carbon; but when the coal is densely packed in the grate and the supply of air is insufficient, a poisonous gas is formed which burns with a blue flame. It disappears when the coal burns freely. — *Cooley's Chemistry*, page 45.

Wood charcoal, being light and porous, ignites readily, burns rapidly with little or no flame, and gives out more heat than an equal weight of any other fuel.

Anthracite coal is next in heating power. Owing to its density it kindles slowly, but when once thoroughly ignited it burns with an intense heat, without flame, smoke, or soot, and for a long time.

Bituminous coal ignites readily, burns with much flame and smoke, but yields less heat than anthracite.

Soft woods kindle quickly, burn with much flame, produce intense heat, and leave but few coals.

Hard woods kindle and burn slowly, with less flame, but afford a large mass of coals, which retain the heat a long time.

FIRES.

The carbon and hydro-carbons in fuel will not burn or unite with oxygen and produce rapid combustion except at a very high temperature, — that is, when made very hot. The temperature at which this union takes place is called the burning-point. This varies in different substances, and special means must be employed to produce it.

Some substances, like the phosphorus on matches, will burn very easily when heated by friction. The phosphorus ignites the sulphur, and the burning sulphur makes the wood hot enough to burn, and thus we have a little fire. If we hold the burning match near large pieces of hard wood or coal it will not make them burn, because the match will burn out before they are hot enough to take fire. But if we place paper or shavings and a pile of small pieces of soft wood under the hard wood, and apply the lighted match to the paper, we soon

have a bright flame. The burning shavings heat and kindle the soft wood; this in turn kindles the hard wood and coal; and in this way we make our fires.

The wood or coal will burn until they are nearly consumed, if they have the proper supply of air. The air, entering from beneath, should have room to circulate freely through the entire mass of wood or coal. There should also be a way for the smoke and products of combustion to escape freely.

In wood and coal there is a small amount of mineral matter. It will not burn, and in the process of combustion it is left as ashes. These settle under the fire, and, if allowed to accumulate, hinder the burning.

A fire for cooking purposes is best made in an iron box, or, as it is usually called, a stove, or range. By so doing we confine the heated air within a certain space, and can obtain more or less heat, as may be required. By means of a pipe we connect the stove with a chimney having an opening into the outer air. The ashes drop through a grate in the bottom of the fire-box into the pan beneath. We control the amount of heat obtained from the fire by dampers in the stove and pipe. These increase or diminish the supply of fresh air, regulate the circulation of hot air through the flues of the stove, and afford an outlet for the imperfectly burned carbon and products of combustion.

Through ignorant or careless management of a fire, much fuel is wasted, health is impaired, and not seldom human lives are sacrificed. Charcoal and anthracite coal should not be burned in close rooms, especially in open stoves, with the pipe dampers closed, or where there is a poor draught in the chimney. Poisonous gases are formed, which if inhaled cause death by suffo-

cation. It is, therefore, a matter of vital importance that we so regulate our fires and ventilate our rooms that the air may not be impregnated with these deadly gases.

THE MAKING AND CARE OF A FIRE.

Remove the covers, and brush the ashes from inside the top of the stove into the fire-box. Replace the covers, close the dampers, and turn over the grate. Shake the lower grate, letting the ashes sift through into the ash-pan. When the dust ceases to rise, brush out the oven, remove the cinders from the lower grate, and reserve them to burn again. When taken out in this way, the ashes in the pan will not require sifting. If there be no lower grate, remove the ashes and cinders together, and sift them. Pick over the cinders carefully, and throw out any stones, slaty pieces, or bits of clinker. These should never be burned, as they injure the lining of the fire-box; but any pieces of half-burned coal should be saved. Always take out the ashes before lighting the fire, for if they are left in the pan, sparks and lighted coals will drop into them. It is then highly imprudent to remove them, unless they are to be placed in a fire-proof ash receiver. Fires have often been occasioned by careless storing of hot ashes.

Put into the fire-box, first, shavings or loose rolls of newspaper, letting them come close to the front; then fine pine kindlings, arranged crosswise, that the air may circulate freely between the pieces; be careful to have them touch each end of the fire-box that the coal may not drop through to the grate. Then put on enough hard wood, arranged in the same manner, to come to

the top of the fire-box. Put on the covers, open the dampers, and brush the dust off the stove.

Moisten some stove-polish with cold water, and put it on the stove with the "dauber." Rub the blacking in thoroughly, then light the paper from below the grate, and while the fire is kindling polish the stove with the dry polishing brush. Blacken the stove while it is cold, but polish as it begins to heat.

When the wood is well kindled, put in a few more pieces of hard wood, and press the coals down to the grate. Put on coal enough to cover the wood, and when this has kindled fill the fire-box to the top of the lining. By making sure that the hard wood kindles first, and adding the coal gradually, much trouble is saved; for unless the kindling be well seasoned, and part of it hard wood, and plenty of it used, it will either not kindle or it will burn out before the hard coal kindles, and then the coal must be removed and the fire rebuilt. The blazing heat from the wood alone warms the stove, and the oven quickly becomes hot. If you have charcoal or Franklin coal, it may be put on at first with the wood.

When the blue flame is no longer seen, close the oven damper; and as soon as the coal is burning freely, shut the front damper. Then regulate the fire by the slide or damper in the pipe.

While making and watching the fire, empty the tea-kettle, wipe out the inside, fill it and the reservoir with fresh water, — never from the hot-water tank, — finish polishing the sides and back of the range, and brush up the hearth and floor.

When a hot fire is needed for several hours, add a sprinkling of new coal before the first has burned out,

and add to it often enough to keep the fire at a uniform heat. Be careful not to add enough to cover and thus check the fire, and never have the coal above the top of the lining.

When the fire is not needed for the present, add a little fresh coal, and close all the dampers in two or three minutes, or as soon as the blue flame disappears. Never shut off all the draught on a red-hot fire without putting on a little fresh coal, if you wish to keep it in good condition to use again. It is important to remember that when all the coals are red they are nearly burned out, and will not give out heat for so long a time as when partly black and partly red.

To quicken an old fire, open all the dampers; and if the coal is black or only partly burned on top, pick out the ashes underneath with the poker, and when it begins to burn more freely add a sprinkling of coal and shake the grate. Keep the grate free from ashes when a very hot oven is needed. But if the old fire has burned so low that all the coals look red or ashy, always put a few pieces of small coal on the red coals, and when these are burning add a few more carefully; then shake the grate gently, or pick out the ashes. If you shake a whity-red or dying fire, the ashes fly up and settle on the coals and put out the little life there is in them.

During cold weather, or when a fire is required for heating purposes as well as for cooking, it is more economical, with most first-class stoves, to keep the fire night and day, letting it go out occasionally if the grate become clogged. But when it is no longer wanted for either purpose, turn the grate over at once that there may be no unnecessary burning of the coal.

Once a month clean out the ashes and soot from the flues back of the oven and under it. There are openings made for that purpose.

When anything is spilled on a hot stove, scrape off the thickest part of it at once with an old knife, and wipe off the grease by rubbing hard with a crumpled newspaper.

Suggestion to the Teacher.

The first lesson should be mainly about the chemistry and management of the fire. Let the pupils become familiar with the names of, and places for, all the utensils; learn the table of abbreviations, and, after preparing the receipts, repeat from memory what they have done. But do not tell them about the composition of potatoes until the next lesson. For further information about fire, combustion, stoves, fuel, etc., see "Boston Cook Book," pages 1–8.

It may be more practicable in some localities to use a wood, gas or kerosene stove, and if so, pupils should be taught how to manage them, and especially to keep them clean and free from soot. The new portable stoves for the burning of the gas from denatured alcohol are particulary valuable for cooking schools in places remote from the gas supply, and for itinerant teachers.

RECEIPTS FOR LESSON I.

Baked Potatoes.

Select potatoes of uniform size. Wash and scrub them well. Bake in a clean, hot oven from 30 to 45 m., or until soft. Break the skins to let the steam inside escape. Serve, at once, uncovered. Should there be any potatoes left over, peel them at once, that they may be in better condition to warm for another meal.

Croûtons.

Cut stale bread in half-inch slices. Remove the crusts, and cut into half-inch cubes. Put them on a shallow pan, and bake until brown. Use them in the place of toast, or as a garnish, or in soups and stews.

Bread Crumbs.

Put the crusts, broken pieces, and crumbs of bread on a shallow tin plate in a moderate oven, and heat until dry and crisp. Roll fine, sift, and keep them in a dry place. Use them to cover articles which are to be fried.

Abbreviations.

tbsp.	stands for tablespoonful.	**m.**	stands for minute
tsp.	" " teaspoonful.	**h.**	" " hour.
ssp.	" " saltspoonful.	**qt.**	" " quart.
c.	" " cupful.	**pt.**	" " pint.
hp.	" " heaped.	**lb.**	" " pound.
spk.	" " speck.	**oz.**	" " ounce.

Questions on Lesson I.

1. What have you come here to learn?
2. Why do we cook our food?
3. What is cookery?
4. How is our food cooked?
5. Is there anything which has not been cooked, suitable for us to eat?
6. How do we obtain the heat to cook our food?
7. What is fire?
8. What is there in wood or coal that burns?
9. How came the heat and light in the wood or coal?
10. What is coal?
11. From what is the oil we burn made?
12. From what is illuminating gas made?
13. What do we have to do to wood or coal to make them burn?
14. Why is it better for us that they will not burn without our help?
15. What is one of the quickest substances to burn?
16. How did people make a fire before they had matches?
17. What is it on the match that burns first?
18. Why not burn our wood or coal outside the house, on the ground?
19. What is this iron box in which we are making the fire to-day?
20. What is the difference between a stove, a portable range, and a brick set range?
21. Why do we make our stoves of iron?
22. Why do we place the stoves near the chimney?
23. Does all the wood or coal burn?
24. What is smoke?
25. What are ashes?
26. How do we control the heat from the fire?
27. What kinds of wood are hard?
28. How can you tell soft wood from hard wood?
29. Which wood gives out the most heat?
30. Which wood is best for kindling?

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31. How many ways of cooking food can you mention?
32. What is the easiest thing to cook, — that is, what requires the least preparation and the fewest things to work with? We have only our stove and our fire; no hot water, no saucepans or kettles. What can we cook?
33. What is baking?
34. Large potatoes require 45 m. to bake. Dinner is to be served at 11.30; what time must the potatoes be put into the oven?
35. Do potatoes require a hot, or a moderate, oven?
36. How can you tell when the oven is hot enough?
37. Why do you scrub potatoes?
38. In what part of the oven do we put them?

39. Why do we have a rack or grate across the middle of the oven?
40. Which are the best for baking, — very small, medium, or large potatoes?
41. How can we tell when the potatoes are done?
42. Which is more important, — to bake them until soft, or just the 45 m.?
43. If they chance to be done before we are ready to eat them, what should we do?
44. Some people send them to the table in a covered dish, to keep them warm. Is that the best way?
45. What happens to baked potatoes if they are left for a time with the skins unbroken?
46. Can they be warmed over?
47. When some of the class talk about potatoes I am reminded of a hard, soggy, shrivelled, poorly baked potato; but when others speak of them I immediately think of a plump, smooth, mealy, well-baked potato. Can you tell me why?
48. What are croûtons, and with what are they eaten?
49. What use can you make of small pieces of bread?
50. Should even a crumb of bread be wasted?
51. How can you keep bread crumbs for a long time?

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52. What does "ssp." stand for?
53. How do you write or abbreviate "tablespoonful"?
54. What is the meaning of "abbreviate"?
55. What is the abbreviation for "pound"?

NOTE. — The questions given here are suggestive only, for the teacher must adapt the questions as well as the instruction to each class or pupil.

LESSON II.

FOOD.

We learned in our last lesson about rapid combustion, by which we obtain heat to cook our food. In this lesson we are to learn what food is, and about animal heat, a result of slow combustion.

Food is anything that nourishes the body, or helps to support life.

To live, to grow, and to be in health, the human body must have the power to move, and must be kept warm. When the voluntary muscles of the body lose their power of motion, they are said to be paralyzed; and when the heart ceases to move the whole body soon after dies.

Motion, whether of the whole body or of its smallest part, results in waste. New material, equal to the waste, must be supplied, or the body will be entirely worn out; and until maturity there should be material for growth as well as for repair. The particles of worn-out tissue must be removed from the body to keep it in a healthful state.

The living human body always has internal warmth. No matter how the temperature of the external air may change, the internal temperature keeps almost exactly the same. A variation of a few degrees always causes death.

Food, therefore, in order to support and nourish life, must supply the body not only with building material, but also with fuel to develop animal heat.

How is this supplied?

All living bodies, whether vegetable or animal, are capable of growth from within, and of repairing their own waste. But lifeless substances, such as manufactured articles, are constantly wearing out and cannot restore themselves, but must be repaired by some power from without.

The living plant, if surrounded by air and a suitable soil, light, and the proper temperature, has the power, through its leaves and roots, to take from these sources all that it needs for growth and nourishment.

The living animal also has similar power, but animals wander about from place to place, and are not, like plants, always in contact with their food. Sometimes they have work to do, and cannot be seeking food. For these reasons animals are provided with a storehouse in which to lay by, at intervals, a supply of material for growth and repair. They are also provided with a monitor, in the shape of nervous structure, to tell them when the storehouse is empty, and are surrounded by an almost unlimited supply of material from which to select, according to their need.

All that is required of them, therefore, is to heed the voice of this nervous monitor, replenish the storehouse at the proper time, with a suitable amount of the right kind of food; and the remaining work — the making of the food into a part of themselves — will be done by the energy within.

How does food build up the body?

Food, as we see it on our tables, bears little resemblance to our bodies; but if we study and compare them we shall find that they are composed of similar sub-

stances. The solid part of the flesh and blood is largely fibrin and albumen, substances similar to the fibres and juices of meat and fish. Eggs, milk, peas, beans, and grains also contain other varieties of fibrin and albumen. When we analyze these substances still farther, we find nitrogen is the element common to all; and it is from these nitrogenous foods that the bodily substance is chiefly built up.

A small part of the body is fat, a substance similar to the fat which we eat in the form of butter, oil, fat meat, etc. Fats, from whatever source obtained, when analyzed, are found to consist of carbon, oxygen, and hydrogen.

The bones, teeth, skin, hair, and nails contain, in addition to these elements, a larger proportion of mineral matter. Grains, vegetables, fruit, meat, milk — in fact, all things we eat — contain mineral matter, oftentimes in solution.

Although dissimilar in appearance, the body and our food are both made up of substances which contain the same elements, the principal of which are oxygen, hydrogen, carbon, and nitrogen. There are small quantities of phosphorus, sulphur, iron, potassium, silicon, calcium, etc.

But food, in the form in which it is eaten, cannot nourish the body and sustain life. It must first be changed, and converted into a fluid that can pass through very small channels into the blood. The blood, laden with food, and enriched with oxygen in the lungs, is carried by the arteries to the capillaries, which penetrate every part of the body. There it is taken up by the living cells, and changed by them into their own tissues. Each little cell or particle of tissue, whether of bone,

flesh, brain, nerve, hair, nail, or gland, has the power to select from this common supply such material as it especially requires, and convert it into its own substance.

By this power our food is assimilated, or becomes a part of ourselves; but only for a time, for the cells are as constantly breaking down as building up. The wearing-out process goes on incessantly, creating a demand for new material as long as life lasts.

The particles of worn-out tissue and the surplus of new material are taken out of the way, partly by the capillaries and partly by the lymphatic vessels, and carried as the venous blood to the lungs, where they are got rid of or changed, as we shall learn in the next section.

How does food keep the body warm?

To obtain heat in the stove we need carbon and hydrogen to be burned and oxygen to burn them. To obtain animal heat, the same elements are essential. All our food contains compounds of carbon and hydrogen, the same elements that are found in wood and coal. Many of our foods contain compounds of nitrogen. These carbonaceous and nitrogenous foods are eaten in a natural or in a prepared state, and, after undergoing certain processes of digestion, are absorbed into the general circulation. Through the lungs, oxygen from the air enters the blood. So we have in the arterial blood all the elements we had in the coal fire, — carbon and hydrogen in the form of new material and worn-out tissue, and oxygen taken in at every breath. This blood is carried all over the body; and then in the cells, chiefly in the muscles, the oxygen combines with the carbon and hydrogen, producing carbonic acid gas and watery vapor.

This chemical action develops heat just as truly, though at a lower temperature, as in the coal fire. But instead of combining so rapidly as to produce fire and light, this animal combustion goes on so slowly and continuously as scarcely to be noticed except when vigorous exercise increases the amount of fire, or lack of fuel diminishes it.

Carbonic acid gas and watery vapor — products of combustion — are given off from the lungs in the exhalations. The mineral salts and the nitrogenous residue, together with the larger part of the water, escape through the kidneys and skin.

Some of the food, being indigestible, never enters the blood, but leaves the system as excrement.

In the coal fire, we have been advised to "keep the grate free from ashes and clinkers when a bright fire is needed." Equal care is essential in respect to the fire within our bodies. The pores of the skin must be kept open by frequent bathing, and a suitable amount of water be taken daily, to aid in digestion and assimilation of food, and in the removal of the waste products.

Coal burned in a stove gives out heat to warm our rooms and to cook our food, and if burned in an engine, converting water into steam, gives force with which to do mechanical work. So, in animal combustion, the burning of the foods by the oxygen liberates their stored-up energy. This energy is given out partly as heat — keeping the body temperature at 98° — and partly in the form of mechanical work.

Thus our food renders a threefold service to that most wonderful machine, the human body: furnishing heat to keep it warm, material to build it up, make it grow, and keep it in repair, and energy with which it may do its

work, whether that work be the voluntary activity of our hands, feet, and brains, or the involuntary motions by which are performed the great functions of respiration and circulation.

CLASSIFICATION OF FOOD.

NITROGENOUS FOODS.

Foods that supply material for growth and repair are called nitrogenous foods, because some nitrogenous compound is found in them.

They are also called proteids, from a Greek word meaning "first," because in the living cells which are the first principle or form of life there is always nitrogen.

A common name is albuminous foods, because the most familiar form of these nitrogenous compounds is egg albumen, as found in the white of an egg. The word is derived from the Latin *albus*, meaning "white." Albuminous substances exist in many forms, and are called by different names in different things. They are found largely in meat, fish, milk, peas, beans, and grains. The albumen and fibrin in the juices and flesh of meat and fish, and in the juices and membranes of some vegetables and fruits, the casein in milk, the vegetable casein in peas and beans, and the gluten of grains, are all forms of nitrogenous substances, or proteids.

Nitrogenous foods are often classified as flesh-forming, and other foods as heat-producing; but these terms are misleading, because nitrogenous foods also contain carbon, and give out heat.

But there are foods containing carbon which do not contain nitrogen; and these, in which carbon is the chief element, are called

CARBONACEOUS FOODS.

Though the internal normal temperature of the body is only 98°, the amount of heat produced by the slow combustion going on in the body, as mentioned on page 19, is considerable. It has been estimated that this heat obtained during twenty-four hours, if confined within certain limits, would be sufficient to raise nine gallons of water from a temperature of 70° to 212°. A portion of this heat is derived from nitrogenous foods, but the greater part of it is obtained from carbonaceous foods. These are classed as fats and carbohydrates.

Fats. These include butter, the fat of meat and fish, oils, eggs, and some kinds of cheese.

Fats stand at the head of heat-producing foods, and are necessary in winter and in cold climates. They serve other and important uses in the body. A small amount is necessary in digestion, and indispensable to perfect nutrition.

"Fat forms the principal material of certain tissues, which, by filling the spaces between the bones, muscles, and the different organs of the body, give rotundity and beauty to the form, equalize external pressure, diminish the friction of the parts, and being non-conductors of heat, keep the body warm." An undue accumulation of fat is a species of disease, and disease just as surely results from a deficiency of fat.

Carbo-hydrates (*Starch, Sugar, etc.*). Other carbonaceous foods, called carbo-hydrates, are the starches found in grains, peas, beans, and some vegetables, and the sugars found in the sap and juices of plants, vegetables, and fruits. Sugar is also found in milk; but we take

most of it in the form of pure sugar, made from the sugar-cane.

These carbo-hydrates form the larger part of our diet, and are very important and useful foods.

MINERAL FOOD OR ASH.

Under the general term salts, or mineral matter, are included various combinations of lime, soda, potash, sulphur, phosphorus, magnesia, and iron, which are found principally in cereals, milk, meat, fish, and fruits. They are found in so minute quantities, that if, through ignorance or improper cooking, we are deprived of them, the system suffers from the want of them; and it is from the ill effects which follow that we judge their office to be a most important one. They replenish certain tissues, and are indispensable to the perfect building up of the body. More mineral matter is needed when the body is young; and it is especially important that children should not be deprived of it by being fed exclusively on arrowroot, sago, tapioca, etc., which are purely starch.

How much is needed we do not know; but the best development follows when the supply is from foods which are naturally rich in mineral matter, rather than from its addition to other foods.

Chloride of sodium, or common salt, seems to be essential to the proper digestion and absorption of food, and since there are many foods in which it is not found in sufficient quantity, it must be added to them. From habit, more is often used than the system requires; and when taken in excess it acts as an irritant, and sometimes occasions disease.

On the charts these mineral substances are classed as ash, because if the foods were burned there would be left a solid residue, resembling the ashes left in burning wood or coal.

WATER.

While water cannot in the usual sense be called a food, it fills one of the most important offices in the nutrition of the body, and ranks next to oxygen as a supporter of life. It constitutes about three fourths of the whole body. It forms a large part of the muscular tissue, and is found even in the bones. It abounds in the blood and secretions, giving them the necessary fluidity, thus enabling them to dissolve the important materials they contain, transport them over the body, and carry away the used-up material.

Water is the great regulator of animal heat, for by its evaporation in perspiration it prevents or reduces any excessive temperature of the body.

We are constantly losing a large quantity of water through the lungs, skin, and kidneys. This loss must be supplied, or life cannot go on. A large amount of water must be taken as a beverage, and care must be taken to have it free from any harmful substance. Although it is found in all kinds of solid food, yet there are many foods to which it must be added in cooking.

Suggestion to the Teacher.

Review the lesson on making the fire and baking potatoes. Illustrate the table of measures and weights. Give a brief outline of the purpose of food and its classification, illustrating by the foods used in the two lessons.

MEASURING.

Accurate measurement is necessary to insure success in cooking. Sift dry materials before measuring.

Measure flour lightly, without shaking down, and butter by packing closely.

A cup holding just half a pint (beer measure) is the standard measuring cup. See note, page 26.

A cupful is all the cup will hold without running over, — full to the brim. A scant cupful is within a quarter of an inch of the top.

A tablespoonful of flour, sugar, butter, rice, chopped vegetables, and crumbs, is a rounded spoonful.

A teaspoonful of salt, soda, pepper, baking powder, and spice, is a level spoonful.

A heaped spoonful is all the spoon will hold.

Half a spoonful is measured by dividing through the middle lengthwise, or by using the new half teaspoon.

A speck, or a shake, or a few grains is what you can pile on a quarter-inch square surface.

TABLE OF MEASURES AND WEIGHTS.

4 ssp.	= 1 tsp.	4 c. flour	= 1 lb.
3 tsp.	= 1 tbsp.	2 c. solid butter	= 1 lb.
4 tbsp.	= ¼ c.	2 c. gran. sugar	= 1 lb.
2 gills	= 1 c.	3 c. meal	= 1 lb.
2 c.	= 1 pt.	1 hp. tbsp. butter	= 2 oz.
2 pt.	= 1 qt.	1 hp. tbsp. sugar	= 1 oz.
4 qt.	= 1 gallon.	2 c. solid meat	= 1 lb.
8 qt.	= 1 peck.	1 tbsp. liquid	= ½ oz.

RECEIPTS FOR LESSON II.

Baked Apples.

1 tsp. sugar, 1 **tbsp.** water, to each apple.

Wipe the apples, remove the core, and put them in a granite or earthen dish. Put the sugar in the centre of each apple, and the water in the dish. Bake in a hot oven from 20 to 30 m., or until soft, but not until broken.

Baked Crackers.

½ tsp. butter to each whole cracker.

Split round crackers in halves, spread the inside with a thin layer of butter. Put them, buttered side up, into a pan, and brown in a hot oven. Serve plain or with soups and oyster stews.

Baked Crackers with Cheese.

Mix 1 tbsp. crumbled or grated cheese, ½ ssp. salt, ¼ ssp. pepper for each whole cracker. Toast as in the first receipt, spread with the cheese mixture, return to the oven, and warm until the cheese is melted.

Cracker Brewis.

Prepare the crackers with the cheese, put them in a shallow earthen dish, add ¼ c. of milk to each whole cracker. Bake until brown, or until the milk is absorbed. The pepper may be omitted.

Questions on Lesson II.

1. What part of a tsp. is a ssp. ?
2. How many tsp. in a tbsp. ?
3. If you had no cup, how could you measure ½ c. of flour with a tbsp. ?
4. What part of a c. is a gill ?
5. How many cups in a qt. ?
6. How do you measure ½ tbsp. ?
7. How many cups of gran. sugar in a lb. ?
8. If you wanted a lb. of flour, and had no scales, how could you measure just one lb. ?
9. How much will ¼ lb. of butter measure ?
10. How many hp. tbsp. of butter in a cup ?
11. How many in ½ lb. ?
12. How much would 1 tbsp. of sugar weigh ?

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13. What is there in the wood we burn which is in the food we eat ?
14. What is the purpose of carbonaceous foods ?
15. What do we mean by flesh-forming foods ?
16. Are flesh-forming, albuminous, and nitrogenous foods the same ?
17. Where do we obtain the oxygen to keep the fire within us burning ?
18. Where do we obtain the fuel for this fire ?
19. What is the bellows with which we blow this fire ?
20. What vegetable that we have learned to cook contains carbon ?
21. What is this substance called ?
22. What foods that we have used contain water; sugar; mineral matter; muscle-making food ?
23. In what form have we used fat in these lessons ?
24. Why are we hungry after vigorous exercise ?

Note. — The quart in beer measure is larger than that of liquid measure by which milk is now sold. A quart of milk will not contain 4 cups, measured by the cooking-cup measure. The standard cooking cup should be of a size that will hold just half a pound of water, or granulated sugar, or butter packed in solidly. Two tin cups divided by grooves, one into quarters and the other into thirds, and holding just half a pint, beer measure, should be in every kitchen.

Note to the Teacher.

On account of the variation in different pupils' ideas of a rounded spoonful, many teachers prefer to use the level measurement for everything; but experience shows that it is better to teach pupils to measure in a variety of ways. Weighing is best for many things, but the eye may be trained to exactness, and judgment may be acquired. After memorizing the table of weights and measures, let the pupil have frequent comparison of weights and measures and practise in measuring by the eye.

Liquids are always measured level, but if you dip a tablespoon into melted butter, molasses, cream, etc. you take up what adheres to the under side of the spoon and have more than when you pour the liquid into the spoon. Salt, pepper, spices, soda, and baking powder are measured level, for a level teaspoonful is the proportion needed in most combinations, and exactness is essential to keep the proportions correct.

Flour, cornstarch, and sugar are commonly measured in a tablespoon, and for the sake of accuracy it is better (until the eye has been well trained) to use the level measurement. With the left hand dip the spoon into the sifted material and with a knife in the right hand scrape off all that is above the rim of the spoon. But remember to use *two* level tablespoonfuls where *one* is specified in these recipes.

As many recipes call for an ounce of butter and scales are not always at hand, butter has been commonly measured by the rounded tablespoonful, an ounce filling the spoon and rounding over or up as much above the edge as the spoon hollows below. Time and butter are wasted by packing butter into a tablespoon and scraping off to a level measure; unless the butter is soft it is difficult to pack; and if soft and you dip the spoon into the butter, you cannot allow accurately for that which is on the under side.

Surely there can be no better opportunity to teach accuracy of measurement, and economy of time, labor, and material, than to train a pupil to cut off at once the amount of butter desired. Any one can learn and remember that a rounded tablespoon is equal to two of level measure, and make one motion answer for two. A rounded tablespoon also equals one-eighth of a cup or one-fourth of a quarter lb. print of butter. Divide this quarter lb. once each way and you have four cubes about one inch in size. These cubes will be slightly larger in butter that is soft and watery than in that which is close-grained and has been thoroughly worked over. If you have not a pound print or ball of butter, weigh a pound of tub butter and pack it into rectangular shape; divide it into halves when a cupful is desired, or into quarters if you wish a half cup; and divide the quarter into four cubes and lay aside until needed; and thus save the waste and uncertainty which comes from packing butter into a cup or spoon.

Should the teacher prefer the level measurement, it will be well to remember that in the following recipes a level measure is intended where all teaspoons and saltspoons, or tablespoons of liquid are called for; and that a rounded measure is intended for all tablespoons of solid material, unless a heaped measure is indicated; a heaped is equal to two rounded or four of level measurement.

LESSON III.

BOILING, OR COOKING IN WATER.

We have learned about baking, or cooking by dry, confined heat, and now we are to learn about cooking in a boiling liquid. This is the most common form of cooking, and water is the liquid usually employed.

Nearly every kind of food needs the action of water, or some other liquid, combined with heat, to cook it in the best manner.

Some seeds and grains, when fully grown, lose by the ripening process nearly all the water that was in them, and become very hard. They need to absorb a large amount of water in cooking to replace that which they have lost.

Other foods contain so much water that simply heating them cooks them sufficiently, while still others are improved by having the water they contain taken away

Some foods have flavors which are affected by the temperature of the water and the length of time they remain in it.

To understand the different effects of cold water and boiling water upon food, and also the time required for cooking in water, we need first to learn about boiling water. When we cook in boiling water, we really cook the water first; that is, we heat or boil it.

We will put a cupful of cold water in a saucepan over the fire, and see what happens. When it becomes so

hot that we cannot bear the fingers in it we will take the temperature. This is scalding hot water. Soon we see tiny bubbles forming on the edges and bottom of the pan. This is the air in the water which expands by the heat. These air bubbles disappear as they reach the colder water near the top, and the cold water being heavier goes to the bottom. This makes a slight motion in the water which we call simmering, and which is often mistaken for boiling. Water simmers at about 180°.

After a while all the water is very hot, that nearer the bottom is changed into steam, large bubbles of steam rise rapidly and soon break above the surface, making quite a commotion or bubbling all over the top, and we say "the water boils."

We take the temperature, and find it boils at 212°. As the bubbles break the steam escapes, and when it comes in contact with the cold air above and outside the kettle it is changed, or condensed, into a fine mist. We call this mist steam, but the real steam is invisible.

Thus we learn that boiling is the changing of water or liquid into steam by the action of heat sufficient to cause commotion or bubbling on the surface.

Any solid must first be melted into a liquid before it can boil. We do not really boil our potatoes; we cook them in boiling water.

After boiling the water some time we take the temperature again, and find the water is no hotter than 212°. We increase the fire to make the water boil faster, and the force of the steam lifts the cover, and the water runs over and spatters the stove; but we find the water is no hotter. The excess of heat escapes in the steam, and in ordinary kettles it is impossible to retain the whole of it.

We cover the kettle, and some of the steam condenses into water on the inside of the cover, drops back again into the kettle, and gives up its heat. So although we do not gain any greater degree of heat by boiling rapidly, yet by keeping the cover on more of the heat is kept inside. The steam, as it changes from a vapor to a liquid, gives back the heat that it has, and by keeping in the steam we can economize heat.

We cool a portion of the boiling water, and find it tastes flat. This is because the gases, or air, which gave it a fresh taste have escaped.

If we let the water all boil away, or be changed into steam, we find only a rim or deposit of brown scum on the edge of the pan.

We learn by this experiment in cooking or boiling water —

That it boils at 212°, or when it bubbles all over the top;

That when once it boils all over it becomes no hotter, and fuel and heat are wasted when it boils at a galloping rate;

That the kettle should never be so full that the water, as it expands in heating, will boil over;

That it loses its freshness by long boiling, and should be used at once;

That it boils away faster if uncovered;

That in time it will all evaporate and pass off as steam, and more must be added as needed;

And, lastly, that the water leaves a deposit on the kettle, which, if not removed, will in time affect the taste of the water.

These are only a few of the many facts to be learned

about boiling water, but they are sufficient for our lesson.[1]

We will take for our experiment to-day some foods which contain starch and albumen, and see what effect cold water or boiling water has upon them. In this way we learn how to cook our food in water.

EXPERIMENT WITH STARCH.

If we soak thin slices of raw potato in cold water, after a while we find a sediment in the pan. This is starch, which has dropped out of the cells which were cut by slicing. This sediment may be purified and dried, and then it will be like the pure starch of commerce.

Pure starch is a fine white powder, and is found enclosed in cells in the various grains, seeds, and vegetables.

We will wet a teaspoonful of cornstarch with a little cold water. It appears to mix with the water, but after standing a short time the starch is found at the bottom of the bowl, and the water is clear again, showing that it has not united with the starch; but by stirring this wet starch till a smooth paste is formed, and pouring it quickly into boiling water, we find that the membranes

[1] Water boils at a higher temperature when there is sugar or salt or anything in it to increase its density.

Water boils at a lower temperature when the pressure of the air upon the water is diminished. Before a rain the pressure of the air is lessened, because the air when filled with vapor is lighter. Things burn on more quickly at such a time because the water evaporates more rapidly. The pressure of the air is less the higher we ascend above the level of the sea, and at an elevation of 14,150 feet water boils at 188.6°. Cooking in boiling water requires a much longer time, therefore, in mountainous regions, for the water boils so quickly that it has less heat than at lower altitudes, where it is subject to greater pressure.

of the starch grains swell and burst, and the fine powder inside unites with the boiling water.

We learn from this experiment that cold water does not affect starch; and that boiling water is absorbed by the starch grains, causing them to swell and burst, and form a thick, sticky mass, which, when cold, is quite stiff. Starch is from the German word, *stärke*, meaning "stiff."

This experiment teaches us the first important principle of mixing dry and liquid ingredients; and also the rule for boiling starchy foods: *Any starchy food in the form of a powder, like flour or cornstarch, when it is to be used as a thickening, should first be wet with a little cold water to form a smooth paste.* Then add more cold water until it is thin enough to pour. Stir it quickly into rapidly boiling water, and the grains will burst uniformly.

If *boiling water* be poured upon fine *dry* starch, the grains are so compact it will not reach all of them. Some will burst more quickly than others, some will not burst at all, and the mass will be lumpy.

But all other starchy foods, like whole grains, vegetables, tapioca, etc., should be put directly into boiling water.

Starch in its uncooked, insoluble state is unwholesome. All starchy foods should be moistened with a sufficient amount of liquid, and subjected to a great degree of heat, that all the grains may swell and burst.

EXPERIMENT WITH ALBUMEN.

Albumen is a substance found in many foods in both solid and liquid forms.

The white of eggs is nearly pure albumen. The yolks contain a smaller portion of it. The albumen in the

white of egg is in a clear, liquid form; but if we put an egg into boiling water, the white soon becomes opaque, thick, and creamy, then tough, and finally the white is quite hard and brittle, and the yolk dry and mealy, or easily crumbled. The two kinds of albumen in the egg coagulate at 122° and 166° F.

Blood albumen is found in the juices and fibres of lean meat. A piece of lean meat, if put into boiling water, shrivels and contracts, and the juices stay in the meat. The water is unchanged. But these small pieces of meat which were put into cold water at the beginning of the lesson have colored the water red and given it a taste, which shows that the juices have been drawn into the water. On heating this water, we find the red color changes to brown, and the water seems thicker. Soon the brown substance becomes harder, separates entirely from the water, and, when the water stops boiling, settles. Blood albumen coagulates at 160°.

By this experiment we have learned that cold water draws out albuminous juices and holds them in solution, and that boiling water hardens albumen.

Nearly all vegetables contain starch and a small amount of albuminous matter, and are generally cooked in water.

We shall learn to-day about cooking potatoes; and as the principles are the same for cooking all vegetables, if we learn how to cook one kind well, we can, by following the special directions, cook any kind as occasion may require.

POTATOES.

Potatoes are three fourths water. The solid matter consists largely of starch, with a small quantity of albumen and mineral matter, — chiefly potash salts held in

solution in the juices. New potatoes, unless perfectly ripe, contain but little starch. In late summer and in autumn they are in their best condition. The amount of starch and albumen diminishes by keeping; and in spring, or when the potatoes begin to sprout, a part of the starch changes to gum, and this makes them sticky or waxy. Some of the water has evaporated, the membranes of the starch cells are dry and hard, and their value as food is diminished.

The amount of albumen in potatoes, though small, is more than that in any other of the moist vegetables. This, together with the fact that they are cheap and palatable, combine well with other foods, and are easily cultivated and kept, makes them a favorite vegetable food. But they have been greatly overrated, and should not be used alone, or in too great proportion. For they contain little heat-giving and flesh-forming material, and if they be depended upon mainly for sustenance, so large a bulk of them is required that the system is overtasked. They should be eaten with fat and meat to make perfect food.

As they contain starch, they must be cooked to be wholesome, and it is important not to lose any of their nutriment in the process of cooking. The most economical methods are baking, steaming, and boiling.

There is a difference of opinion as to whether potatoes should be pared or not pared before cooking. Many claim that the most nutritious part of the potato is the part in and near the skin, and that this is lost by paring. This is chiefly mineral matter, — silica, — an element needed by the hair and nails. The potash salts — the most valuable mineral constituent — are probably held in solution all through the juices, and if these juices are drawn out, no doubt much of the potash escapes.

Potatoes are often grown in soils not adapted to them, and are liable to disease. They belong to a poisonous family, and contain a bitter juice in and near the skin, which makes them indigestible. In cooking, this bitter principle is set free by the heat, and goes off with the steam, if they are opened or uncovered at once; if not, the potato absorbs it and becomes bitter. So, unless potatoes are sound and of the best quality, it is better to pare them before boiling, and to take off quite a thick paring, that all this juice may escape; and they should always be pared when they are to be cooked for people with weak digestion. If any of the potash salts are lost by paring, they can be supplied by the use of salads and other green vegetables and fruits. If not pared they should be thoroughly scrubbed, to remove all the earthy matter adhering to the skin. The skin of new potatoes is thin, and may be removed by scraping instead of paring.

Potatoes, when pared, turn brown if exposed to the air, and each should be covered with cold water as soon as pared, and should not be pared long before cooking. In the spring, when they are shrivelled and become gummy, soaking improves them by supplying the water they have lost and dissolving the gum, making them less sticky; but at any other time it is undesirable.

If we examine the potato under the microscope, we can understand why, in cooking, it should be put into boiling water rather than into cold. The starch is found throughout the potato, enclosed in cells the walls of which are thin membranes of an albuminous nature. Each cell contains ten or twelve grains, surrounded by a watery, albuminous juice. In cooking the potato, this juice becomes boiling hot, the starch grains absorb it and

burst; so that each cell, which before cooking was wet and hard, is now filled with soft, mealy starch. If we begin to cook our potatoes by putting them into cold water, some of the gum and potash salts will be drawn out, and the starch will not begin to cook until the water boils. Hence, though the potatoes may look and taste well, no time is gained in cooking, and they must have lost some portion of their nutriment. But if put into freshly boiling water, this hardens the albuminous membranes of the outside cells, and prevents the escape of the juices. The water should boil gently, to prevent the potatoes from breaking. Salt should be added to slightly increase the density of the water and thus raise the boiling-point, and help retain the soluble matters. And lastly, and most important of all the steps in the process, the potatoes should be taken up the moment they are done, — that is, when a fork will pierce them easily. They should be drained at once, then shaken, and left uncovered, to let the water inside, which has not been absorbed by the starch, pass off as steam. If we cook them after the starch is all softened, the starch on the outside will absorb the bitter, boiling water in the kettle; after a time the potato will break up and partly dissolve, and we shall have a bitter, pasty, potato gruel, instead of a firm, but soft and mealy potato.

GENERAL RULES FOR COOKING VEGETABLES.

Prepare them for cooking as follows: —

Potatoes, scrub, and pare when necessary.
Parsnips, scrub till white, trim off the fine roots.
Carrots, scrub, and scrape off the thin outer surface.
Turnips, scrub, cut in slices, and pare.

Beets, wash carefully, for if the skin be broken the sugary juices will escape.

Cabbage and cauliflower, trim and soak top down to draw out any insects.

Celery, wash, and scrape off any rusty portions.

Spinach and other greens, pick over and wash in several waters.

Onions, peel and soak.

Green corn, husk with clean hands, but do not wash it.

Peas and beans, shell with clean hands and wash quickly.

Soft-shell squashes, wash, pare, and cut as desired.

Hard-shell squashes, wash, split, and cook in the shell.

Asparagus, wash and break off the tough end, tie in bundles, or break into inch bits.

String beans, strip off the ends and strings on each side, cut or break into small pieces, and wash.

Fresh vegetables do not require any soaking in cold water, and it is better not to prepare them until you are ready to cook them. But if they be wilted, soaking will freshen them; and if they must be prepared long before cooking they should be covered with cold water to prevent them from wilting or from becoming discolored.

Put vegetables into freshly boiling water, slightly salted, and cook quickly until done. The time will depend upon the age or freshness of the vegetable.

With green peas, shelled beans, green corn, asparagus, celery, and spinach, use as little water as possible, and let it boil away, leaving just enough to moisten, and thus save all the desirable soluble matter that may have been drawn out. Do not salt until nearly done.

Cook cabbage and cauliflower, uncovered, in a large kettle of rapidly boiling salted water, with a saltspoon of soda.

Onions, scald and change the water twice.

All others, cook in water enough to cover, and drain it off after cooking.

Greens, summer squash, cabbage, and other watery vegetables should be pressed in a cloth or strainer, and well drained.

TIME-TABLE FOR BOILING.

Eggs, coffee, clams, oysters	3 to 5 m.
Green corn, small fish, and thin slices of fish	5 to 10 "
Rice, sweetbreads, peas, tomatoes, asparagus, hard-boiled eggs	15 to 20 "
Potatoes, macaroni, squash, celery, spinach, cabbage	20 to 30 "
Young beets, carrots, turnips, onions, parsnips, cauliflower	30 to 45 "
String beans, shelled beans, oyster plant	45 to 60 "
Winter vegetables, oatmeal, hominy, and wheat, chickens and lamb	1 to 2 hrs.
Fowls, turkey, veal	2 to 3 "
Corned beef, smoked tongue, beef à la mode	3 to 4 "
Ham	4 to 5 "
Small pieces of meat, allow 15 m. to warm through, then for every lb.	15 m.
Halibut and salmon in cubical form, per lb.	15 "
Blue-fish, bass, etc., per lb.	10 "
Cod, haddock, and small fish, per lb.	6 "

Seasoning. — One pint of vegetables, mashed or sliced, or one pint of small whole vegetables, requires 1 tbsp. butter, ½ tsp. salt, ½ ssp. pepper. Squash, peas, and beans are improved by 1 tsp. sugar. Milk or the vegetable liquid may be used to moisten such as are too dry.

Suggestion to the Teacher.

Let the pupils try the experiments as given in the lesson, and thus learn by observation about boiling water and its effect upon starch and albumen. Three or four potatoes may be boiled, then riced, mashed, seasoned, and made into cakes. Beef tea may be prepared from the meat used in the experiment, and the bit of meat put into hot water may be minced and mixed with the potato cakes. The effect of boiling water upon eggs may be illustrated by allusion to what they already know, leaving the boiling of eggs till another lesson, or for the pupil to try at home. Potatoes have been discussed quite minutely as an illustration of the method of teaching the composition of food, but other foods will not be explained so fully for want of space. The teacher should be familiar with all the subjects taught, and give oral information as to their nature, composition, manner of growth or production, modes of cooking, digestibility, etc., illustrating from the charts and museum. For further information about vegetables, see "Boston Cook Book," pages 289–316.

RECEIPTS FOR LESSON III.

Boiled Potatoes.

Select potatoes of uniform size. Wash and scrub them. Pare and cover with cold water. Put them in a saucepan of *boiling* salted water. (1 qt. of water and 1 tbsp. of salt for 6 large potatoes.) Cook ½ h., or until soft. Drain off every drop of water. Place the saucepan, uncovered, at the back of the stove to let the steam escape. Shake it gently. Serve very hot.

Rice Potato.

Mash the potatoes as soon as they are boiled and drained. Rub them with a wooden masher through a strainer into a hot dish.

Mashed Potato.

To 1 pt. of hot boiled potatoes, add 1 tbsp. of butter, ½ tsp. of salt, a spk. of pepper, and enough hot milk to moisten. Mash in the saucepan in which they were boiled; beat with a fork till light and creamy, and turn out lightly on a hot dish.

Potato Cakes.

Make cold mashed potato into small round cakes about ½ inch thick. Put them on a baking tin, and brush them over with milk. Bake in a hot oven till golden brown.

Soft-Boiled Eggs.

Put the eggs into a saucepan, cover with boiling water, and let them stand from 6 to 10 m. where the water will keep hot (180°) but not boiling. The white

should be soft and jelly-like, and the yolk soft but not liquid. If cooked in boiling water, cook from 3 to 5 m.

Hard-Boiled Eggs.

Cook them 20 m., in water just bubbling. The yolk of an egg cooked 10 m. in rapidly boiling water is tough and indigestible; cooked 20 m. it is dry, mealy, and easily digested.

Beef Tea.

Cut lean, juicy raw beef into quarter-inch dice. Cover with cold water, and add ½ tsp. salt to every cup of water. Press the meat often, and after an hour squeeze out all the juice. Heat the juice, stir it constantly, and serve as soon as it looks thick and is hot.

Questions on Lesson III.

1. Can you think of any grains or seeds which become hard and dry when ripe?
2. What vegetables contain water enough to cook them?
3. What vegetables need to have the water they contain pressed out after cooking?
4. What are the first bubbles which we see when water begins to be heated?
5. How do the steam bubbles differ from the air bubbles?
6. Do we really see the steam?
7. What is boiling?
8. What is the temperature of boiling water?
9. Does rapid boiling increase the temperature of boiling water?
10. What becomes of the excess of heat?
11. Why does boiled water taste flat?
12. How do you use starch as a thickening?
13. Should starchy food be put into cold or into boiling water?
14. What is the effect of boiling water upon egg albumen?
15. What is the effect of boiling water upon blood albumen?
16. When are potatoes best as food?
17. What do they lack, and what should be eaten with them?
18. When should they be pared?
19. When is it better to soak them?
20. Why should they be taken up as soon as done?
21. Why do we leave them uncovered?

LESSON IV.

STEAMING, AND OTHER FORMS OF COOKING IN BOILING WATER.

We have found that some starchy foods need rapid cooking in boiling water, directly over the fire. The danger of burning them is avoided by using plenty of water.

Sometimes it is desirable to cook more slowly than we can in boiling water, and some foods require only a limited amount of water; or it may be they are sticky and glutinous, and it would be inconvenient to be constantly stirring them to prevent burning. It is then better to cook either over boiling water or by steam.

Puddings, brown bread, mushes, custards, and other soft, sticky, glutinous mixtures are often cooked in a covered pail or mould, which is placed in a kettle of boiling water. There should be a trivet or muffin-ring under the pail to keep it from the bottom of the kettle, and allow the water to be under as well as around it. The kettle should be closely covered to keep in the steam, and the water kept boiling steadily the required time. The heat in the inner pail is less than that of boiling water, but it is sufficient to cook the mixture. It takes a longer time than some other ways of cooking, but if the fire be rightly prepared, and the supply of water sufficient, it needs less attention. It is an economical and satisfactory method, answering well the

first great purpose in cooking, — that of developing flavor with little loss of substance.

A double boiler is a utensil made for cooking on this principle. It has two boilers; the upper one, holding the food, fits tightly half way down into the lower one, which contains the boiling water. The steam is partially confined, and as it changes from the gaseous to the liquid form, or condenses on the inner boiler, it gives up its heat sufficiently to cook the food.[1]

These modes of cooking are often called steaming, but they are only other forms of boiling; the cooking by real steam is a very different process. Sometimes superheated steam is forced through pipes into a receptacle containing the food, and in this way a greater degree of heat is obtained.

But cooking by steam is commonly done in a steamer or covered pan with perforations in the bottom. This is placed over boiling water, and the food is kept entirely out of the water, but in direct contact with the steam, which, coming through the perforations, condenses, gives up its heat, and cooks the food. Some vegetables, fruits, meats, and other foods or mixtures which have sufficient moisture in themselves are cooked in this way. Watery vegetables are made drier; tough, dry meats are softened, and made tender; and flour mixtures have a different flavor from that obtained by dry heat or cook-

[1] It has been supposed that adding salt to the water in the lower boiler would increase the temperature of the boiling-point from 212° to 224°; but it would take one pound of salt to a quart of water to raise it to that point, and this quantity would soon corrode the boiler. Two ounces of salt to a quart of water would raise the boiling-point two degrees. But by using the same amount of chloride of calcium, — not chloride of lime, — the temperature could be raised to 240°; and if a pound to a quart were used it would reach 350°.

ing in water. In the first two methods the heat is conveyed from the boiling water through the boiler to the food. In the real steaming, the steam carries the heat directly to the food.

To-day we are to learn more about starch as it is found in grains like rice and oatmeal; also about an albuminous substance contained in grains and called *gluten*, because when dry it is tough and sticky like glue.

These grains of oatmeal are hard and dry. You remember we learned in the last lesson that many things dried in ripening, and needed a large amount of water to swell and soften them. If we were to cook oatmeal in the oven, without anything else, as we did the baked potatoes, it would be harder and drier than it is now. But the potatoes became softer by baking.

If we wanted a thin gruel of oatmeal we should cook it in a large quantity of water until the starch and gluten were swollen and softened; but when we make oatmeal mush we want to have it more like solid food than pasty gruel. We cannot drain off the water as easily as we did from the potatoes, so we must be careful to use only so much water as is needed to swell and soften the starch and gluten. Oatmeal, for mush, requires four times its bulk of water; fine oatmeal a little less.

We use boiling water because oatmeal is not a fine powder like the flour, and the grains will separate easily without being first wet in cold water, and because the boiling water bursts the starch grains quickly, and begins at once to cook them. If we put the meal into cold water, the starch will come out into the water, and make it gluey and pasty. This thickened, gluey water cannot soften the gluten quickly, so it takes a longer time

to cook, and it always has a raw, pasty taste. We add salt because there is not enough in the grain, and then we must cook it until the gluten is thoroughly softened. Cook it rapidly at first, directly on the stove, about ten minutes, to burst all the starch grains. When the water is nearly absorbed, place the pan into, or over, another of boiling water. The steam will keep the water in the meal hot enough to soften the gluten, but not hot enough to boil and waste away and so make the mush too dry; and this slow cooking will soften the gluten more thoroughly than rapid boiling, and develop a better flavor.

Rice may be cooked in a double boiler; but as it will absorb a great amount of water and yet only needs a little to soften it thoroughly, it is important to use the right proportion, or it will be too moist. It requires only twice its bulk of boiling water, and will cook in half an hour.

MILK.

In cooking some kinds of food, milk is used in the place of water. Milk contains water, sugar, salts, fat, albumen, and casein.

After it stands awhile, the fat separates and rises as cream. The sugar and salts are dissolved in the water of the milk. The casein is dissolved in fresh milk, but when the milk becomes old, and sours, it separates from the watery part and forms a thick mass which we call curd. This curd is made into cheese. Now as milk contains all these substances it is thicker than water, and when we boil it, it adheres to the pan and burns quickly. The bubbles of water in the milk, as they change into steam, rise rapidly, the albumen hardens, and forms a

skin-like coating; as this skin is thick and tenacious, owing to the other substances in the milk, these bubbles do not break quickly at the surface as clear water bubbles do, but stretch and climb one upon another till they run over the edge of the pan. By heating milk in a double boiler we avoid the danger of its burning or running over. When the whole surface is covered with air bubbles, — not steam bubbles, — the milk is hot enough, though not actually boiling. The temperature of boiling milk is slightly higher than that of boiling water, and it will not boil over boiling water.

Rice may be cooked in boiling milk as well as in water, but milk being the thicker, a little more will be required than of water.

Eggs are also cooked in hot milk. When we break an egg, we find the white is soft and without form, and the yolk seems round and firmer than the white; but if we break the film or membrane on the outside of the yolk we find that it, too, is soft and liquid. By beating, we can mix the yolk and white, and be unable to distinguish them. Sometimes we want to use the two parts separately, and it is quite an art to break and divide an egg, and not mix the yolk with the white. When eggs are cooked in milk, the albumen in the egg thickens, and if cooked slightly, and stirred constantly, forms a smooth, soft, creamy mass. If cooked longer, and without stirring, it becomes thick and solid; but if cooked too long the casein and albumen become quite hard, and separate from the watery part, or the mass curdles.

Eggs cooked in milk, and seasoned with salt, pepper, and butter, are called poached eggs. When they are sweetened we call the mixture a custard.

When eggs are eaten raw, or cooked in any way in which the result is to be a smooth, soft mass, the thick white substance uniting the yolk and white should be removed before cooking, unless the cooked mixture is to be strained, as in soft custard. This substance hardens into a lump, and it is unpleasant to find it in what would otherwise be a smooth mass. In eggs cooked in the shell, or cooked hard as in cake, it is not perceptible.

THE COMBINATION OF FOODS.

All the different kinds of food material — water, salts, sugar, starch, fat, and albumen — must be combined in our diet, for a substance which fulfils only one of the purposes required in our food will not support life. A man cannot live on water or salt, yet he would soon die without them. If our clothing is torn we do not repair it with sand. So if the muscles are worn out by hard work we cannot replace them by eating sugar.

The albuminous foods, though they are considered the most nutritious, must not be taken in excess, for they will load the blood with more building material than it can use. If more fat be taken than the oxygen will burn, or than is needed for storage, we may suffer in several ways.

Many articles of food do not contain all the necessary elements, and few foods contain them in the right proportion. It is necessary, therefore, to have different kinds of food, and to proportion them rightly, so that one kind will supply what another kind lacks.

Some flavors are more highly developed by combination with other foods; and one great purpose in cooking is to bring out flavors that shall tempt the appetite and increase our enjoyment of food. For food, first

by its savory odors, then by its attractive appearance, should gratify the senses of smell and sight, before the sense of taste is awakened. When this is done, the pleasures of taste are heightened; and food that tastes good is more readily digested and assimilated, and we really derive more nourishment from it.

It must also be adapted to the state of one's health, and to the various circumstances of age, occupation, and climate.

In our lesson to-day we have an illustration of the proper combination of food materials.

Neither rice, potatoes, apples, cheese, eggs, nor oatmeal should be taken alone.

Rice and potatoes contain little except water and starch, supplying only two of the needful substances. Large quantities of them must be taken to give sustenance.

Eggs and cheese, though rich in muscle-making elements, lack water, and are too highly concentrated. Apples, taken alone, supply little beside water, and oatmeal alone is dry and unpalatable. But by serving the custard as a sauce with the rice, the milk, egg, and sugar furnish what the rice lacks.

Serve the steamed apple with the oatmeal, adding milk, or cream, and sugar, if desired. The tart apples improve the taste of the mush. Eat butter with the potatoes, and crackers with the cheese. Add salt to everything, and thus have a suitable combination.

Suggestion to the Teacher.

The important points in the lesson are accurate measurement, comparison of weights and measures, care in the breaking of eggs, the beating with a fork in place of an egg-beater, the use of a covered pail as a substitute for double boiler, and the proper combination and serving of food.

RECEIPTS FOR LESSON IV.

Oatmeal Mush, with Baked Apples.

½ c. coarse oatmeal.
½ tsp. salt.
2 c. boiling water.

Pick over the oatmeal, put it with the salt and boiling water into the upper boiler. Place the upper boiler on the stove and boil rapidly 10 m. Stir occasionally with a fork; then place it over boiling water, and cook from 40 m. to 1 h. Serve with baked or steamed apples, and milk and sugar.

Fine hominy and *granulated wheat* are cooked in the same way, but they require only three times as much water as meal.

Whole or *cracked wheat* requires five times as much water as meal, and should cook four or five hours.

Steamed Rice.

½ c. rice.
½ tsp. salt.
1 c. boiling water.

Pick over and wash the rice in three or four waters. Put it with the boiling water and salt into the top of the double boiler. Steam for 20 m., or until tender. Serve as a pudding, with boiled custard, or as a breakfast dish with poached eggs.

Boiled or Soft Custard.

1 c. milk, scalded.
1 egg.
1 tbsp. sugar.
½ tsp. flavoring.

Beat the egg to a froth, add the sugar, and a spk. of salt; mix well; add the scalded milk, and stir over boiling water till it thickens. Strain at once, and when cool add the flavoring. Serve alone or as a sauce with rice.

Coddled or Poached Eggs.

¼ c. milk, scalded.
1 egg.
1 tsp. butter.
1 ssp. salt.
½ ssp. pepper.

Beat the egg slightly, add milk, butter, salt, and pepper. Stir over hot water till it is quite thick. Serve hot, on toast or rice.

Steamed Apples.

Wipe, core, and pare the apples. Place in a steamer and cook until soft.

Steamed Potatoes.

Wash and pare the potatoes. Place in the steamer and cook about 30 m., or till they are soft.

Questions on Lesson IV.

1. What kinds of food are usually cooked over boiling water?
2. What is a double boiler?
3. What is a good substitute for a double boiler?
4. How does the heat reach the food in a double boiler?
5. What is steaming?
6. Which do we do, — pare, or peel, an apple; a banana; a squash; an onion?
7. What is gluten?
8. Why not bake oatmeal as we baked potatoes?
9. Why is it necessary to measure the water in cooking oatmeal?
10. Why do we put it into boiling water?
11. Why do we cook it slowly after the first ten minutes?
12. How much water will be required to cook one cup of rice?
13. What is cream?
14. What is casein?
15. Why does milk boil over the pan more quickly than water?
16. What is the safest way to heat milk?
17. What is custard?
18. What are the substances which we need in our daily food?
19. Does any food contain them all?
20. What foods contain them in nearly the right proportions?
21. Why can we not live on rice alone?
22. Why can we not live on eggs alone?

LESSON V.

FIRST LESSON IN MEAT.

MEAT is a general term applied to the flesh of animals used for food. It includes the muscular flesh, sinews, fat, heart, liver, stomach, brains, and tongue, and is divided into three classes: —

Meat proper, including beef, veal, mutton, lamb, and pork;

Poultry, including chicken, turkey, geese, and ducks, or all domestic fowls;

Game, including partridges, grouse, pigeons, quail, and other birds, venison, and any wild meat that is hunted in the forest, or field.

All meat should be removed from the brown paper in which it is wrapped as soon as it comes from the market, or the paper will absorb the juices, and the meat will taste of the paper.

Let us examine a piece of meat. We first wipe it all over with a clean, damp cloth, to cleanse it; but it should never be put into water, as this draws out the juices.

We find large masses of red flesh or muscle, made up of little bundles of thread-like fibres, separated by white membranes, and the large masses separated by cellular tissue. These fibres seem full of a red, watery juice. There is fat on the edge, or inner skin, also between the fibres, and large masses of it are between the muscles and in the hollow bones. We find a small amount of

bone; a hard, white, gelatinous substance around the joints, called gristle; and white, shining, tough membranes or tendons at the ends of the muscles.

These masses of fibre we call the lean meat. In one place the thread-like fibres seem coarse and flabby, separate easily, and have thin membranes connecting them. If we press it we find only a little juice. In another section the fibres are smaller, finer, are very close together, and feel hard and firm. We cannot separate them there is so much of the tough, white membrane; but there is a large quantity of juice. In still another piece we find soft, tender fibre, with very little membrane and juice.

Good beef should be bright-red when first cut, well marbled with yellowish fat, and with a thick outside layer of fat. The flesh must be firm, and when pressed with the finger no mark should be left. The suet should be dry and crumble easily. The best mutton is that from a large, heavy animal, and should have an abundance of hard, clear-white fat, and the flesh should be fine-grained and bright-red. Poor mutton has but little fat and little flesh as compared with the bone. More depends upon the quality of the meat than upon its location in the creature. A piece from the sirloin in a poorly fed creature may not be so rich in flavor and nutriment as one from the flank in a stall-fed animal.

The muscles that are used most are the toughest, but they contain the larger amount of juice, for the blood circulates more freely through them. The heart is a muscle used more than any other, and has a very tough, close, compact fibre.

The legs have large, thick muscles which start near the lower end, among a mass of tendons and cords, and

grow larger, thicker, and more tender, till at the upper end they are very thick. Here is where we shall find the largest masses of lean meat with only the small round leg bones. The upper part of the leg is called the round, and the lower end the shin.

On the thighs, or rump, there are large, broad bones, with large muscles, branching out in several directions, which are tender and very juicy. The muscles on the upper part of the fore leg are smaller, and not so tender as those on the round.

Where the fore leg joins the shoulder, and down the back, we find the shoulder blade — a broad, flat bone — and the backbone, also a number of small muscles running in all directions. We cannot expect to find any large masses of meat there; but we do find bone, gristle, and fat, with thin layers of meat interspersed between them.

Under the shoulder blade, and extending down the backbone to the loin, are the ribs, running at right angles with the backbone, meeting at the breast and tapering off at the loin. These bones are covered with a thick muscle near the back, and with many layers of muscle, fat, and tough membranes, extending round to the breast.

On the loin, and close to the backbone, there is a muscle which is not much used. It is merely a cushion over the bones; and this is all tender and juicy, and is considered so choice that it has been named "Sir Loin."

Inside of the loin and under the short ribs is another muscle which is so little used that it is very soft and tender, and it has but little juice or flavor. This is called tenderloin.

On the flank or under part of the body there are no bones, but a great many thin, flabby muscles with large

classes of elastic membrane between them, so they can be stretched to a great size. They cross, and lap over, and extend in many directions, and sometimes have large quantities of fat stored between and under them.

The ends of the legs, and the large joints, have large masses of gristle and tendon, which contain gelatine, — a substance which softens in cold water, and then dissolves by long, slow cooking in hot water. But when cooked by dry heat it becomes very hard.

You can easily see that in an animal there is a great amount of bone, fat, etc., and only a small portion of choice, tender, juicy, lean meat. The thick, lean, tender portions on the rump and loin are the choice and expensive parts. These are best when cooked quickly, by intense heat, as in roasting and broiling; they have so much juice and such tender fibre, they do not need the solvent agency of water. We shall learn about this in another lesson.

But the tougher, cheaper parts of lean meat are very juicy, and when properly cooked afford a large amount of nutriment. The bones contain nitrogenous and mineral matter, a portion of which can be dissolved by proper cooking; the fat is rich in heat-giving material; and the gelatinous portions are useful.

The juices of meat contain many substances which are valuable as food, and the savory principle which gives flavor to the meat and causes it to differ in different animals. Meat should always be cooked in such a manner as to retain the largest proportion of this juice.

In salting meat this juice is drawn out into the brine, and although there is some nutriment in the fat and fibre of salt meat, it is less nutritious than fresh meat.

It is therefore important, as a matter of economy and health, that we learn how to cook all parts of meat so as to obtain the greatest amount of nutriment.

The fibrin of meat is hardened and contracted by dry, intense heat, but softened by moderate and long-continued heat. Albumen dissolves in cold water, but hardens in hot water and by dry heat. Therefore all meat that has a tough, hard, or flabby fibre, with much gristle, tendon, and bone, should be cooked in water, and at a moderate heat.

We cook meat in water for three distinct purposes:

First, to keep the nutriment within the meat, as in boiled meat;

Second, to draw it all out into the water, as in soups and meat broths;

Third, to have it partly in the meat and partly in the water, as in stews, where we eat the broth with the meat.

We are to learn to-day about several ways of cooking meat, where the object is to keep the nutriment in the meat.

BOILED MEAT.

In boiling meat we leave the meat whole, that only a small surface may be exposed. Plunge it into boiling salted water enough to cover, and keep it there for five or ten minutes. This hardens the albumen over the entire surface, and makes a coating through which the juices cannot escape. Then move the kettle where the water will be just below the boiling-point. Cover tightly to keep in the steam and the volatile, aromatic compounds which give flavor to the meat. A small amount of albumen from the outer surface will be dis-

solved and rise as scum. This should be removed, or it will settle on the meat and render it uninviting in appearance. The salt coagulates this albumen and helps it to rise. It also slightly raises the boiling-point of the water, and by increasing its density aids in preventing the escape of the juices.

Meat cooked in this way requires a longer time than when kept boiling furiously, but it is made more tender, and has a better flavor. It will take fifteen or twenty minutes for the heat to penetrate to the centre of the meat before the cooking process begins. Then allow twelve or fifteen minutes for each pound of meat.[1] Two pounds in a cubical form will require a longer time than the same weight cut thin and having a broad surface.

Notwithstanding the pains we take to keep the nutriment in the meat, some portion of it escapes into the water, and therefore the water should be saved and used for a gravy or in warming over the meat.

Meat is sometimes cooked in water in the oven instead of over the fire, and this way of cooking is often erroneously called roasting.

Roasting means to heat violently, and is done either before the open fire, or in a very hot oven without any water. If water be used the meat cannot be made any hotter than boiling water; and a much greater degree of heat is required to cook such meats as have tender fibre and are rich in juice and flavor, so that the outside surface may be quickly seared and prevent the escape of the juices.

Tough pieces, which require the solvent power of water, and which are lacking in flavor, are improved by the addition of a savory stuffing, or by seasoning the water with herbs and vegetables; also by first browning

[1] See page 62.

the meat in hot dripping. The flavor imparted by the partially confined heat of the oven is stronger than that of boiling.

Sometimes meat is steamed over boiling water until it is made very tender, then put in the oven to be browned and receive the flavor which can be obtained only by means of this dry heat.

Another way is to steam it in its own juices. This is called smothering, or pot roasting. The meat should be left whole for convenience in slicing and serving neatly, particularly if to be served cold. If cooked over the fire a little water should be put in the kettle to prevent burning, and be kept hot but not boiling. Some of the juices are drawn out into the water, and the steam from this heats and softens the meat. These juices make a rich and savory gravy.

A convenient way is to put the meat into a tightly covered jar, place it in a very moderate oven for one hour, or until some juice is drawn out, then increase the heat and cook a half hour for every pound of meat. There will be a large quantity of juice in the jar, which should be diluted with water, thickened, and used as a gravy. The meat may be cut in small pieces when the time for cooking is limited.

These are all savory and wholesome modes of cooking the cheaper parts of meat; and fresh meat cooked properly is equally palatable and far more nutritious than corned or salt meat, which forms too large a part of the diet of many people.

The fat of meat is a useful article of food, especially in winter. Every scrap of it, particularly of beef fat, should be used, and all that is not eaten with the meat may be clarified, or made pure and clear.

By heating the fat with water to prevent burning, or with thin slices of raw potato, the water evaporates and the steam carries off the odors or gases. The organic matters in the fat are decomposed or deposited as sediment and adhere to the sliced potato. Clarified fat or dripping answers for many purposes in cookery, — frying, basting roast meat, greasing pans, and as shortening for bread, plain pastry, and various things.

Suggestion to the Teacher.

If it be difficult for pupils to locate the different cuts of meat by studying a diagram, let them imagine an ox as it looks in life, and then compare it with the human body, as that would look if men walked with hands as well as feet. The position of the bones of the legs, back, and ribs can be shown; also the large and small muscles, and the joints, cords, tendons, etc. Then from the meat which is to be used in the lesson explain its composition. Show the difference between tough and tender fibre, gristly, gelatinous portions, fat, bone, juice, etc., and tell briefly how the different parts are to be cooked. Serve the calf's heart for a lunch, and after tasting the beef and mutton, reserve them for the next class to use in warming over.

As meat varies, according to its age and feeding, in the tenderness of its fibre and the amount of connective tissue, gristle, tendon, etc., it is safer to allow at least an hour for the boiling or stewing of any kind, whatever the shape or weight; then increase the time from two to five hours as per time-table.

RECEIPTS FOR LESSON V.

Boiled Mutton.

Wipe, remove the fat, and put the meat into well-salted, boiling water. Boil 10 m. Skim, and simmer 12 m. for each pound of meat, or until tender. One quarter of a c. of rice is sometimes boiled with the mutton. Serve with thickened gravy or parsley sauce poured over the mutton.

Gravy for Mutton.

To each cup of boiling water in which the mutton was cooked add 1 tbsp. of flour moistened with a little cold water, 1 tsp. vinegar, spk. of pepper, and ½ ssp. salt. Boil 5 m., stirring till smooth. Add 1 tbsp. fine chopped parsley, or capers if desired.

Smothered Beef.

Cut 1 lb. of round of beef into one-inch cubes, and put it, in a tightly covered jar, into the oven for 1 h. Let it be in a cool part of the oven for the first ½ h., then increase the heat. Thicken and season the juice and serve as a gravy.

Baked Heart.

Wash the heart thoroughly in cold water to remove the blood, and cut out the veins and arteries. Make a stuffing with 1 tbsp. bread crumbs, 1 tsp. chopped onions (which must first be scalded), 1 ssp. powdered sage, ½ ssp. salt, and a spk. of pepper. Moisten it with milk or water. Stuff this into the cavity and sew the

edges together. Peel, slice, and brown an onion in 1 tbsp. drippings, then brown the heart in the same fat, and put it with the onion in a deep dish, and half cover with boiling water. Bake in a hot oven 1 h., or till tender, basting every 10 m., and add more water if needed.

Beef Tea.

1 lb. shin of beef.
1 pt. cold water.
½ tsp. salt.

Scrape the meat very fine and put it into the cold salted water. Let it stand 1 to 2 h. Put it into double boiler and cook 30 m. Press it through a strainer. Remove the fat with paper. This is very strong beef tea, and may have more water added if liked.

Clarified Fat or Drippings.

Save any scraps or pieces of fat. Cut into half-inch cubes, put in pan, and cover with cold water. Place in an oven and cook slowly for 4 or 5 h., or until the scraps are quite brown and the water evaporated. Several slices of raw potato put in with the fat will aid in the clarifying. When slightly cooled, strain, and set away to cool.

Always clarify and strain fat after using it for frying.

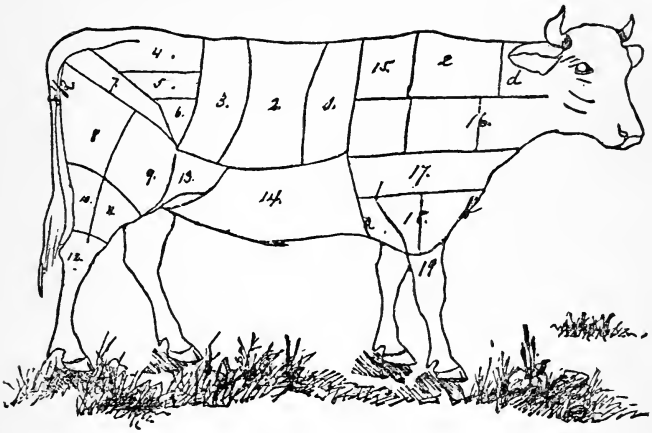
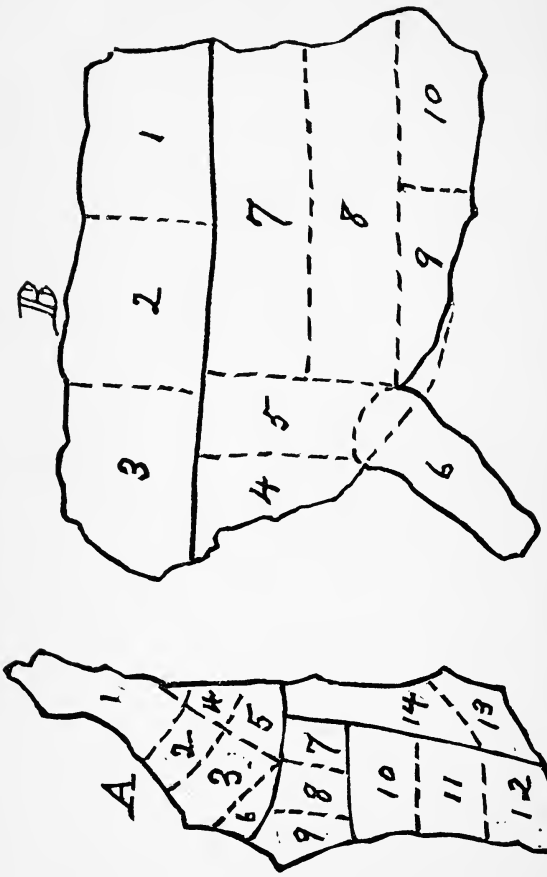


Diagram of Ox.

1. Tip of Sirloin.
2. Middle of Sirloin.
3. First Cut of Sirloin.
4. Back of Rump.
5. Middle of Rump.
6. Face of Rump.
7. Aitch Bone.
8. Lower part of Round.
8½. Top of Round.
9. Vein.
10. Poorer Part of Round.
11. Poorer Part of Vein.
12. Shin.
13. Boneless Flank.
14. Thick Flank with Bone.
15. First Cut of Ribs.
c. Chuck Ribs.
d. Neck.
16. Rattle Rand.
17. Second Cut of Rattle Rand.
18. Brisket (*a*. the navel end: *b*. the butt end).
19. Fore Shin.


B
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A
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14

A. Hind quarter of Beef.
1, 2, 3, 4, 5, 6, Round of Beef.
7, 8, 9, Rump.
10, 11, 12, Sirloin.
13, 14, Flank.

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1. Shin. — Suitable to be used for soups and stock.

2. Lower or poorer part of the round, used for stews, etc.

3. Upper and best part of the round, used for steak and beef tea.

b. Top of round. The best round steak as far as the ridge of fat.

4. Lower or poorer part of vein, used for stews, chopping, braising.

5. Upper and best part of vein, used for boiling, steak, beef tea, spiced beef, etc.

6. Aitchbone, used for roast, stew, and stock.

7. Face of rump, used for a roast or steaks.

8. Middle of rump, used for steak.

9. Back of rump, used for roasts or steaks.

These steaks may be cut with the grain, or across the grain, of the meat. The cross-cut steaks are much the best.

10. First cut of sirloin, used for a roast or steaks. It contains tenderloin.

11. Second cut of sirloin, used for roasts or steaks; it contains tenderloin.

12. Tip of sirloin, used for roast or short steaks. Contains no tenderloin.

13. Thick end of flank. Used for corning, rolling, boiling.

14. Thin end of flank. Used for corning, rolling, boiling.

B. Fore quarter of Beef.
1, 2, 3, Back-half.
4, 5, 6, 7, 8, 9, 10, Rattle rand.

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1. First five ribs or prime ribs. Five-rib cut. Used for roasts and steaks.

2. Five chuck ribs. Poorer roasts and steaks.

3. Neck, used for beef tea, stews, boiling, etc.

4. Sticking piece, used for corning.

5. Shoulder, used for steaks, corning, etc.

6. Shin, used for soups and soup stock.

7. First strip rattle rand, used for corning.

8. Middle strip of rattle rand, used for corning.

9. Butt end of brisket, used for corning.

10. Navel end of brisket, used for corning.

Questions on Lesson V.

1. What is meat?
2. How many varieties of meat can you mention?
3. What is the first thing to do when meat comes from the market?
4. How should it be cleansed?
5. Does every part of meat contain nutriment?
6. How would you select good beef?
7. Where would you find the most juicy meat?
8. In what parts would you find the least bone?
9. What part of the creature is the round?
10. Which is the most nourishing, — the tenderloin or the shin?
11. Which costs most, — the rump or neck?
12. How should meat that contains bone and gelatine be cooked?
13. Which portions of meat are best cooked by quick, intense heat?
14. What are our three objects in cooking meat?
15. How may meat be cooked in water?
16. What kind of a piece of meat would be best to boil?
17. Why do we keep it whole?
18. Why use boiling water?
19. What is the advantage in slow cooking?
20. What use can we make of the water in which we cook meat?
21. How do we improve the flavor of meat cooked in water?
22. What is smothered meat?
23. How may we use the fat of meat?

LESSON VI.

WARMING OVER.

To be able to prepare nice, tempting dishes from the odds and ends that are left over is not only desirable, but should be regarded as a duty; for it is wrong to waste food, even if we have abundant means. By waste I do not mean such remnants of food as are given away or fed to animals, but all good food which is thrown into the refuse barrel or the fire, because there is so little of it.

With care not a scrap of food need be wasted. Because there is not enough for an entire meal, or for every member of the family, is no reason for throwing it away. By combining small portions of different foods that will blend agreeably, quite a large dish may be prepared.

Right here I am tempted to tell you of a dish that I prepared; and although you may not have the same materials, it will show you how to save and combine fragments of food. About a pint of meat left from a roast leg of lamb was made into a stew, with potato, onion, and tomato. After serving for two meals for a family of two, there was left what would fill one small soup-plate, — mostly meat and broth. I carefully removed all the meat, and strained the broth; chopped the meat very fine and put with it the yolk of a boiled egg left from breakfast, and two broken slices of egg toast, also chopped fine; warmed the broth, thickened it slightly

with flour, and mixed it with the meat. As it needed more moisture, an egg was beaten, and part of it put with the meat. As the stew had been highly seasoned, no seasoning was needed except a little salt. From this mixture I made eight cylinder-shape rolls about three inches long, rolled them in fine bread crumbs, then in the remainder of the egg (to which two tablespoonfuls of milk had been added), then in crumbs again, and browned them in fat. So from several fragments, each of which seemed hardly worth saving, enough was prepared, in a tempting form, to serve as a part of two more meals, making that small leg of lamb seem not unlike the "five loaves and two small fishes."

These pieces of meat which we are to use to-day have been cooked until they were tender, and we only need to look them over carefully, and remove the bones, skin, and gristle, and some of the fat, before chopping them. But some kinds of meat which you may have occasion to use at home, such as the tough ends of steak and chops, and the harder and poorer parts of roast meat, should be cooked slowly in just water enough to cover until they are very tender. They may then be cut fine, and used in any of the ways we are to learn about in this lesson.

The secret of warming over meat successfully is to warm quickly such parts as are already tender, and to make tender by long, slow cooking such as are hard or tough. Care in removing all objectionable portions, and a judicious use of seasoning materials, are also necessary.

The chief objection to hash is the presence of small bones, hard gristle, skin, etc., in the mixture, or the greasy, half-browned, soggy condition in which it is served. But when carefully prepared it is a savory and

palatable dish. It is not necessary to have corned beef, as many suppose. Fresh beef, if made tender by stewing and seasoning properly, is more wholesome. It may be varied by making it into round, flat cakes and browning each side, or by using warm boiled rice instead of potato, with such seasoning as may be desired.

Other easy and attractive ways of serving nearly every kind of cooked meat or fish are the cottage pie and the scalloped meat. The latter admits of a great variety of combinations, care being taken to use such foods as are agreeable when combined. Potatoes are best with beef or fish. Rice, macaroni, oysters, and bread crumbs may be used with mutton, veal, or chicken. Onions and tomatoes improve every kind of meat. White sauces are best for fish and light meats; brown gravies are best for dark meats; and tomato or some acid sauce blends well with everything.

All the bones and scraps of gristle, fat, etc., that are not used in the made-over dishes should be covered with cold water, and simmered until the bones are clean and the gristle dissolved. Then strain it, throw the scraps away, and when the liquid is cool, remove the fat, and clarify it for dripping; use the water for gravies with warmed-over meat, or combine it with some vegetable pulp, and use it for soups.

GRAVIES. — SAUCES. — THICKENING.

Gravy is the cooked juice of meat, or a mixture of it with water, thickened with flour.

The term "sauces" is often supposed to include only certain preparations of fruit, like apple-sauce, cranberry-sauce, etc.; or mixtures of butter, sugar, etc., eaten with

puddings; but anything eaten with food to improve its relish may be called a sauce. Gravies are sauces, but not all sauces are gravies.

Gravies are made with meat juice or broth, and may be either light or dark. Sauces are made with meat juice or broth, water, milk, cream, or fruit juice, or mixtures of two or more of these materials. We are to learn to-day only about those which are used with meats.

The consistency of gravies and sauces may be varied by using more or less flour in proportion to the liquid.

The simplest way of making a thickening for gravy or sauces was explained in the third lesson; but when butter or fat is also to be used, it is better to make it according to the direction for tomato sauce, using the onion or not as preferred.

Cooking the flour in the hot butter or fat cooks it thoroughly; for the fat, when it stops bubbling, is much hotter than boiling water. When done in this way the flour never has a raw, uncooked taste, and the butter or fat is absorbed by the flour instead of floating on the surface of the gravy.

When a brown sauce is desired, heat the butter and flour together long enough to have them turn brown, before adding the liquid. The fat browned alone will burn easily, and the flour browned alone in the oven, as many writers — not cooks — recommend, will be baked so hard that it will only color the gravy, not swell and thicken it.

In making a white sauce, be careful to cook the flour in the hot butter, without browning them; and at all times add the liquid *hot*, that it may boil quickly and cause the starch in the flour to swell and burst; and *gradually*, that the sauce may be stirred, while it is like a thick

paste, until it is smooth. If all the liquid be poured on at once, or the mixture be not stirred thoroughly while it is thick, the sauce will be lumpy. Enough liquid must be used to swell all the flour, and make the sauce of the desired consistency. The usual proportion is one tablespoonful of fat and one rounded or two level tablespoonfuls of flour to one cup of liquid; and by varying these proportions, and using different liquids and seasonings, a great variety of gravies and sauces may be made from this general rule as the foundation.

MACARONI.

Macaroni is a nutritious and economical food, and should be used more freely than it is. Much of the dislike for it arises from ignorance as to the proper mode of cooking. It is made from the choicest varieties of wheat, — a grain which contains all the substances needed as food, though not in the proper proportion. Wheat lacks water and fat. Macaroni, being only wheat flour and water made into a hard, dry paste, is not palatable unless cooked, till tender, in plenty of water or other liquid, and seasoned well or combined with other foods, particularly some form of fat, as butter, milk, cheese, eggs, or meat broth.

Macaroni is prepared in a variety of forms, — spaghetti, Italian paste of fanciful shapes, vermicelli, and round, tubular, and flat macaroni. The paste, while soft, is rolled into sheets, and cut with fancy cutters, or it is forced through metallic plates which have perforations, sometimes in the form of small rings with the centre of the hole filled. It is then dried thoroughly, and will keep in a dry place a long time.

Suggestion to the Teacher.

The meat used in this lesson is taken from that which was cooked in Lesson V. Use the boiled mutton for the minced meat on toast; the smothered beef for the hash and cottage pie. The broth in which the meat was boiled will answer for the gravy. The toast should be browned in the oven, for the pupils will have a special lesson in toasting over the coals. Impress upon them the importance of care in preparing these dishes. Save the bones and remnants, with the addition of some new meat, to start stock for next lesson.

RECEIPTS FOR LESSON VI.

Minced Meat on Toast.

Remove the fat and gristle from the mutton, and chop it fine. To 1 c. of meat, add 1 ssp. of salt, a spk. of pepper, and ½ c. thickened gravy. Heat quickly in a saucepan, and pour over slices of toast. Serve hot.

Cottage Pie.

Chop cold meat very fine. Boil and mash some potatoes. To every cup of meat add 1 ssp. salt, ½ ssp. pepper, a spk. nutmeg, and ½ c. of gravy or stock. Put the meat, seasoning, and gravy in a pie dish, cover it with mashed potato, and bake in the oven till golden brown. Omit the nutmeg and add 1 tsp. of finely chopped onion if liked.

Scalloped Mutton.

Cut cold, cooked mutton into small thin pieces. Remove all bone, fat, and gristle. Put a layer of bread crumbs on the bottom of a shallow baking dish, then a layer of mutton, then a layer of boiled macaroni, then gravy. Moisten ⅓ c. of crumbs in 1 tbsp. melted butter, spread over the top. Bake until the crumbs are brown, — about 20 m.

Macaroni.

½ c. macaroni, measured after breaking into inch pieces. Cook in boiling salted water 20 m., or until tender. Drain, pour cold water through it, and serve plain, with hot white sauce or tomato sauce, or use it with meat, in scalloped meat.

Hash.

1 c. tender cooked meat chopped fine, 2 c. hot mashed potato, ½ tsp. salt, ½ ssp. pepper. Mix until there are no lumps.

Put 2 or 3 tbsp. of hot water into a spider. Melt in it 1 tbsp. of butter or dripping. Put in the hash, and let it simmer slowly till it has absorbed the water and formed a brown crust. Do not stir it. Fold over, turn out on a hot platter.

Tomato Sauce.

Melt 1 tbsp. butter in a saucepan; cook in it 1 tbsp. fine chopped onion until yellow, add 1 tbsp. flour, stirring well. Add, gradually, 1 c. mutton liquor, and ½ c. strained tomato. Season with ½ tsp. salt and ½ ssp. pepper.

White Sauce.

Melt 1 tbsp. butter in a saucepan; cook in it 1 tbsp. flour. Add gradually 1 c. hot milk or cream. Season with ½ tsp. salt and ½ ssp. white pepper.

Questions on Lesson VI.

1. How do you prepare tender meat for made-over dishes?
2. What must first be done with tough meat?
3. How many kinds of meat can you think of that might be prepared as we did the hash?
4. How many like the scalloped mutton?
5. What use may be made of the bones, gristle, and fat?
6. What is macaroni?
7. Why is it better to cook flour for gravy in hot fat instead of in hot water?

LESSON VII.

SECOND LESSON IN MEAT.

SOUPS.

NEARLY all parts of an animal may be used as food, but from some parts we can obtain the nutriment in only one way. These are the bones and the gristle, tendons, and other gelatinous portions, some kinds of fat, and the lean meat which is tough and coarse in texture, or difficult to separate from the gristle and cord imbedded in it. Many people consider these portions undesirable, and dealers often have to dispose of them as refuse. But when cooked slowly in water at a moderate heat a large part of their nutriment is dissolved in the water, and may be used in this liquid form. The bony portions in roasted or baked meat are deemed even more undesirable, and are often thrown away as unfit for food. But even if previously cooked, some nutriment may be obtained from them, and they should always be saved and used in soups.

These parts of meat are very cheap, and every family should know how to utilize them. It is better to cook a large quantity at a time, as considerable time is required to extract all the nutriment; and the broth, when obtained, may be kept a week or more.

This liquid in which the meat has been cooked, and which contains all the juices and soluble parts, is used in making soup; and because it can be stored or kept on

hand and drawn upon when needed, it is called *stock*. Stock is from the word *stician*, "to stick, or stay by."

In making soup our object is to draw the nutriment from the meat and bones into the water. So we cut them into small pieces, and soak in cold water before heating, that we may soften and loosen the fibres and extract all the nutriment that is soluble. Some careless cooks soak the meat to cleanse it and then throw the water away. It should be cleansed by wiping with a damp cloth.

We may use all kinds of meat, — beef, veal, mutton, or poultry, — either together or separately. As each kind of meat has its distinctive flavor, we may have a greater variety of soups by using them separately. A very good soup may be made from a mixture of all the bones and fragments of meat which we may happen to have. But to make the most nutritious and palatable soup we need both cooked and uncooked meat, also bone, gelatine, fat, and a variety of seasoning material.

The salts found in the blood and juices of uncooked flesh are valuable as food; therefore a small portion of raw, lean meat is essential in making soup. Browned or roasted meat improves the flavor of the broth, because in such meats the flavor has been more highly developed. The marrow found in the shin bone, and the browned fat of cooked meats, give a fine flavor; and such portions as contain gelatine afford a certain amount of nutriment, and by hardening like jelly when the stock is cold, enable us to keep it longer than if it were in a liquid form. Vegetables which have been cut fine, sweet herbs, spices, etc., are used to season and flavor the stock.

When the juices are drawn out and the water is red, we draw the kettle forward where the water will almost boil, — just bubble on one side of the kettle. This

gentle heat, continued steadily and for a long time, will dissolve the gelatinous portions. The water must bubble slightly, for if the temperature be allowed to fall too low the soup will sour.

The kettle should be closely covered to keep in the steam and the savory odors which would be wasted by evaporation if it were uncovered. It is wasteful to skim soup stock. The scum that rises as the water heats contains some of the very substances we have been trying to get into the water. They increase the flavor of the stock, and should be retained. After a time they settle as sediment, and all the sediment that is fine enough to go through the strainer should be used. In clear soups it may be removed by clearing, but clear soups are not the most nutritious.

After simmering several hours, or until the bones are clean and the meat is in shreds, strain the stock, and throw away the scraps. This worthless residue of muscular fibre, bones, etc., is dry, tasteless, and useless as food. When we need the fibrin from meat, it is better to cook the meat in other ways, as in stews, which are often called soups, but are different, as we shall learn later. Remember, we are not to depend upon soup as a complete food, only as one of a variety of foods, — a sort of stimulant to prepare the stomach for more hearty food.

The stock will keep better if the fat be not removed, as when cold it forms an air-tight covering over the stock. As the fat is more easily removed when cold, it is best to make the stock the day before it is needed, and to strain it into several small jars, that such a portion as may be required may be used without disturbing the remainder.

When you are ready to use this stock for soup, take off every particle of the fat, and save it for clarifying. Heat the portion of stock to the boiling-point, and serve it alone, or put with it any vegetable, rice, macaroni, barley, tapioca, etc., which has been previously cooked till tender.

A general rule for stock: equal parts by weight of meat and bone, and one quart of water to every pound of meat and bone. Where there is more bone than meat, or only cooked meat, water enough to cover is a good proportion. For every quart of water use

1 even tsp. salt.	1 tsp. mixed sweet herbs.
4 peppercorns.	1 tbsp. each vegetable cut fine.
4 whole cloves.	

If allspice, mace, and celery seed be used, less of each spice will be required. The herbs are whole thyme, marjoram, summer savory, and bay leaves. Strip off the leaves and blossoms, break the small stalks in tiny pieces, mix them, and keep them in a tin box. Use a teaspoonful of the mixture, not of each herb. The vegetables generally used are onion, carrot, turnip, celery, and parsley. If you have only two kinds, use more of each. They are only intended to give additional flavor to the broth. When it is desired to eat them with the soup they should be cooked separately, and added to the soup just before serving.

There are some kinds of soup in which portions of the meat are served with the broth. These are made from chicken, veal, ox-tails, calf's head, etc. The meat is not cut as small as when it is to be used for stock. As soon as it is tender it is removed, and then added to the strained stock just before serving.

Soups made from light meats, like veal and chicken,

and from fish, are often made richer by the addition of milk or cream.

Soups are also made from the water in which some vegetables have been boiled, and thickened with the pulp of the vegetables, mashed fine and sifted. Milk or cream is added to improve the flavor and make them more nutritious. The liquid and vegetable pulp should be blended with a little flour, or other starchy thickening, to keep them from separating. Celery, tomatoes, green peas, green corn, carrot, and parsnip may be used for soup in the same general way as the potatoes.

Suggestion to the Teacher.

For further information about soups, with and without stock, see "Boston Cook Book," pages 119–158.

RECEIPTS FOR LESSON VII.

Soup Stock.

2 lbs. hind shin of beef.
2 qts. cold water.
6 whole cloves.
6 peppercorns.
1 bunch of sweet herbs.
1 inch blade mace.
2 tsp. salt.
1 small onion.
½ " carrot.
½ " turnip.
1 sprig parsley.

Wipe and cut the bones and meat into small pieces. Put the marrow, bones, and cold water into the kettle. Soak ½ h. before heating. Add spices and herbs, and the vegetables cut fine. *Simmer* 6 or 7 h., and strain. When needed for soup remove the fat, heat the stock to the boiling-point, and season to taste.

Macaroni Soup.

1 c. stock.
½ stick macaroni.
1 ssp. salt.
1 spk. pepper.

Cook the macaroni in boiling salted water about ½ h., or till tender. Drain, and cut into thin slices or rings; put them into the soup tureen with the salt and pepper, and pour over them the boiling stock.

Mixed Vegetable Soup.

1 c. stock.
1 tbsp. carrot.
1 tbsp. turnip.
1 ssp. salt.

Wash and scrape the carrot, and pare the turnip. Cut into quarter-inch dice. Put into boiling salted water, and cook until tender. Drain and add, with the salt, to the boiling stock.

Rice Soup.

1 c. stock.	1 ssp. salt.
½ tbsp. rice.	

Cook the rice in boiling salted water ½ h., or until tender. Drain and add to the boiling stock.

Potato Soup.

3 potatoes.	1 tsp. salt.
1 pt. of milk or half milk and half water.	1 spk. white pepper.
	½ tbsp. flour.
1 tsp. chopped onion.	½ tbsp. dripping.

Wash and pare the potatoes, put them into boiling water and cook till very soft. Cook the onion in the milk in a double boiler. When the potatoes are done, drain and mash them. Add the boiling milk and the seasoning. Rub them through a strainer, and put them back into the double boiler to boil again. Melt the dripping in a small pan, add the flour, and stir till it thickens. Stir it into the boiling soup. Let it boil 5 m. Add 1 tsp. finely chopped parsley, and serve very hot, with croûtons. If the soup be too thick add a little more hot milk or water.

Baked Bean Soup.

Take the cold baked beans, add twice the quantity of cold water, and let them simmer until soft. When nearly done add half as much tomato. Rub them through a purée strainer. Add more water till the right consistency, season to taste with salt, pepper, and mustard. Heat again and serve with toasted crackers or fried dice of bread.

Questions on Lesson VII.

1. What is the most economical way to use the bones and tough parts of meat?
2. What is stock?
3. Why do we use cold water in starting stock?
4. Why is it better to soak the meat before heating it?
5. Should we leave the meat whole?
6. What is the advantage of using a portion of uncooked meat?
7. May we also use any fragments of cooked meat?
8. Is it enough to put the kettle on the stove, and leave the broth to simmer or not as the case may be?
9. Why do we cover the kettle?
10. What is the scum?
11. What shall we do with the residue?
12. Is soup a complete food?
13. How does fat help to keep the stock?
14. What is a general rule for stock?
15. What is thyme? marjoram?
16. Can soups be made without meat?

LESSON VIII.

DIGESTION, AND INVALID COOKERY.

DIGESTION.

In studying digestion it is well to keep in mind the nitrogenous and carbonaceous classification of food, because the process of digestion differs with the different foods.

The use of digestion is to get the food into a liquid form; for food in the stomach is not really in the tissues of the body, and cannot enter the body through the stomach or intestinal surfaces, except in a fluid form.

There are several steps in the process, — mastication, swallowing, and stomach and intestinal digestion. Each portion of the alimentary canal has its own specific work to do, and is furnished with its own distinctive fluid to help it do that work.

All food should be first divided or crushed, if necessary, by the teeth, then mixed with the saliva and thus softened, and above all moistened thoroughly. The saliva is poured into the mouth in large quantities when the presence of food in the mouth excites the salivary glands to secrete it; and sometimes even the sight or thought of food makes the mouth water. The saliva is alkaline, and helps to digest in part the starchy foods by rapidly changing them into sugar, — provided they are kept in the mouth long enough for a thorough mingling with the saliva, — but it does not cause any

important change in the nitrogenous foods. Bread, potatoes, rice, and all other starchy foods should therefore be thoroughly masticated and mingled with the saliva. Some substances that are very soft, like thin, starchy gruels, or that become soft and pasty when moistened, like hot fresh bread, are swallowed quickly and almost involuntarily; and although the starch is mostly unchanged, and they may be difficult of digestion by some, no permanent harm comes to healthy people from the absence of salivary digestion, as it is supplemented by the pancreatic.

The stomach carries on the second part of digestion. It pours from its walls an acid fluid, and is furnished with muscles which, by alternate wave-like contraction and relaxation, produce a sort of churning, which helps materially to bring all parts of the food under the action of the gastric juice. This juice dissolves the albumen and fibrin of food, forming peptones, which are very soluble. The starch, sugar, and fat are not changed, except mechanically, the fat being melted, and thus set free.

Such of the albuminoids as are dissolved, and large portions of water, may at once be absorbed into the circulation by the veins of the stomach. The remaining food, in the form of chyme, passes from the stomach into the intestines. Here it meets the bile, originally made in the liver, but stored ready for meal-times in the gall bladder, and also the pancreatic juice, derived directly from the pancreas. These fluids are feebly alkaline, and readily neutralize the weak acid of the gastric juice. They convert the starches into sugar, the nitrogenous foods left over by the stomach (if any) into soluble bodies, and the fats into a finely divided state

called an "emulsion," in which the large granules of fat and oil are broken up into minute particles and held in this fluid, very much as cream is held in fresh milk.

The intestinal juice secreted in the mucous membrane the entire length of the intestines has also feeble digestive powers.

The contents of the intestines are now called chyle. The combined amount of the salivary, gastric, pancreatic, biliary, and intestinal fluids secreted daily is said to be about twenty-one pints, of which the gastric juice forms more than one half.

There are mechanical aids to intestinal as well as to stomach digestion. The writhing, worm-like, or "peristaltic" movement of the muscular coats of the intestines, forces the food downward and tends to bring all portions of it in contact with the digestive fluids.

Some of the nutritive and perfectly digested parts of the chyle are next absorbed into the lacteals, which are closely connected with the lining or mucous membrane of the intestines. From these they are emptied into the thoracic duct, and finally into the great veins above the heart. Other portions are carried by the finer branches of the portal vein into the liver, and thence pass into the great veins below the heart.

Thus the venous blood, bringing raw materials from the portal veins and the lacteals, and from the lymphatic vessels waste material, enters the heart through the right auricle, passes through the valves down into the right ventricle, out through the pulmonary artery into the lungs, where as purple venous blood it is driven to the most remote capillaries of the lungs. If the lungs be full of fresh air, the oxygen of the air passes in and changes the purple blood into red oxygenated blood.

This oxygenated blood returns from the lungs and enters the heart through the left auricle, then, through the valves, passes into the left ventricle, then out through the aorta, — the great artery, or "main," — from which smaller arteries carry it to the capillaries all over the body. There this new material in the blood is given up to the cells and changed by them as described in Lesson II.

COOKING AND CARING FOR INVALIDS.

In waiting upon invalids, several things are essential beside the careful preparation of their food, — perfect ventilation, cleanliness, quiet, and strict obedience to the physician's orders.

Have plenty of fresh air and sunshine, but be careful to shield the patient from a draught and any glaring light. Allow nothing in the room that will vitiate the air, — like decaying flowers, kerosene lamps burning low, soiled clothing, etc. Keep the bed, the patient, the room, and everything about yourself, absolutely clean. Avoid all noise, whispering, loud talking, rustling, or any abrupt or suspicious movements. Admit no visitors except with the consent of the physician.

Anticipate the wants of the patient, but do not annoy by unnecessary attentions. When feeding the patient, do it gently and neatly. Serve in small quantities often, and in varied and tempting forms.

Serve hot, liquids ordered to be served hot, and avoid slopping. When the meal is over, remove every trace of food from the room.

FOOD FOR INVALIDS.

When we are well and strong, we need food to keep us so, and also to give us force or energy to do work.

When we work we wear out faster, and so need more food. We need a variety of food, — some kinds that are digested quickly and some that are digested slowly, for if everything we ate were changed at once we should be faint and hungry again very soon.

But when we are ill, sometimes we do not need any food for a time, as it is better for the system to have a period of complete rest or comparative inaction. At other times, we need only a small quantity of food, just enough to satisfy hunger; but that little must be food that can be digested easily, or that will reduce inflammation and quench thirst but will not stimulate. Food in a liquid form is quickly absorbed into the system. Mucilaginous, acid, and aromatic drinks, oranges, grapes, and other fruits, gelatinous broths and jellies, and starchy gruels are useful at such times.

TEA.

Boiling water draws out some flavors which are desirable, if they are simply drawn out and not boiled. We pour boiling water on tea to draw out the flavor. If the tea is steeped, the infusion is agreeable; but if boiled, other substances — tannin, etc. — are drawn out, which are not only unpalatable, but unwholesome. *Infuse* means "to pour into;" *steep* means "to soak." Infuse, or steep, tea; never boil it. Tea should be steeped in an earthen teapot, never in tin. The water should be freshly boiled.

Suggestion to the Teacher.

Pupils should be taught something about digestion. Even if they have never studied physiology they can comprehend the most important steps in the process. A calf's or sheep's heart and a pig's stomach may be procured from the market and used in illustration, or the teacher may illustrate from drawings on the blackboard.

RECEIPTS FOR LESSON VIII.

Lemonade.

1 lemon.
1 tbsp. sugar.
1½ c. boiling water.

Remove the peel in very thin parings, put them into a bowl, add the boiling water, and let it stand 10 m., covered. Add the lemon juice and sugar, and when cold strain it, and add ice if liked.

Apple Water.

1 apple.
1 tbsp. sugar.
1 c. boiling water.
1 strip lemon peel.

Wipe a large, sour apple, and cut it, without paring, into thin slices. Put them into a bowl with the lemon peel and boiling water; cover it, and let it stand till cold. Add the sugar, and when dissolved strain it.

Rhubarb Water.

1 small stalk rhubarb.
1 c. boiling water.
1 strip lemon peel.
1 tbsp. sugar.

Wipe the rhubarb, cut into pieces an inch long. Add lemon peel and boiling water. Let it stand till cold. Add sugar, and when dissolved strain it.

Irish Moss Jelly.

½ c. Irish moss.
4 figs.
1 pt. boiling water.
1 lemon or orange.
⅓ c. sugar.

Soak, pick over, and wash the moss. Put it into the boiling water, add the figs and the thin rind of the

lemon. Simmer until the moss is dissolved. Add the lemon juice and sugar, and strain into a cold, wet mould.

Milk Porridge.

2 doz. raisins, quartered.	1 tbsp. flour.
2 c. milk.	1 ssp. salt.

Boil the raisins in a little water 20 m. Let the water boil away, and add the milk. When boiling, add the flour rubbed to a thin paste with a little cold milk. Boil 8 or 10 m. Season with salt, and strain before serving.

Oatmeal Gruel.

Pound ½ c. of coarse oatmeal till it is mealy. Put it in a tumbler with cold water. Stir well, let it settle, then pour off the mealy water into a saucepan. Fill again and pour off the water, and again repeat this, being careful each time not to disturb the sediment in the bottom of the tumbler. Then boil the water 20 m., stirring often. Add 1 ssp. salt. If too thick add a little cream or milk. Strain, and serve hot.

To Prepare an Orange for an Invalid.

Pare (not peel) around the orange, cutting in deep enough to cut off the inner white membrane. Cut near the membrane of one of the sections straight in to the core; cut in again on the opposite edge. Slip the knife under and scoop out the pulp, but leave the membrane on the core. Lay the membrane back under the left thumb, and cut in the same way into the next section. When all the pulp is removed the membrane should be left on the core. The pulp and juice are more delicious

when taken out in this way than when squeezed out. Remove all the seeds, sweeten to taste, and serve with chipped ice, if desired.

To Chip Ice.

With a thimble on your finger press a large needle into a piece of ice, and chip it off into bits as large as a pea. Mix it with an equal quantity of acid jelly or fruit juice.

Tea.

1 tsp. tea. | 1 c. freshly boiling water.

Steep 5 m. in an earthen teapot.

Cocoa Shells.

½ c. shells. | 1 pt. freshly boiling water.

Boil 20 m.

Questions on Lesson VIII.

1. What is the use of digestion?
2. Where is our food digested?
3. What is the first step in the process?
4. How is our food crushed?
5. Is it necessary to chew soft food?
6. What is the saliva?
7. Is it in the mouth except when food is there?
8. Is the saliva acid or alkaline?
9. What kinds of food does it affect?
10. How does the food get into the stomach?
11. What is the gastric juice?
12. What kinds of food does it affect?
13. What are the digested albuminous foods called?
14. What is chyme?
15. What happens to fats and starchy food in the stomach?
16. How is the food moved about in the stomach?
17. Where is the bile secreted?
18. Where is it stored?
19. What is the pancreatic fluid?
20. How is the food changed in the intestines?
21. What is an emulsion?
22. What is chyle?
23. How much digestive fluid is secreted daily?
24. What pushes the food along in the intestines?
25. How does the chyle leave the intestines?
26. How does it enter the blood?
27. How is the blood oxygenated?
28. Describe the circulation of the blood.

LESSON IX.

INVALID COOKERY, — Continued.

When there is a lack of nutrition from any cause, or after any long-continued or prostrating disease, the system demands immediate nourishment. Food that contains the most nutriment in the most easily assimilated form is now needed.

Milk, to be taken slowly, — sipped by the spoonful, — is given in many cases. Eggnog, meat broth, farina and oatmeal gruel, beef juice, and beef tea are suitable at such times.

After the crisis of disease is past, the system needs gradual but complete nutrition. The appetite is clamorous, fickle, or perhaps altogether wanting. Much depends upon judicious diet, and care must be taken against over-feeding. Broiled game, chicken, chops, and steak are the most easily assimilated meats. Eggs, cream toast, baked potatoes, ice-cream, blanc-mange, simple puddings, and stewed fruits may be used.

TOAST.

We toast bread not merely to brown it, but to take out all the moisture possible, that it may be more perfectly moistened with the saliva and thus easily digested ; then we brown it to give it a better flavor. If the slice be thick and carelessly exposed to a blazing fire, the outside is blackened and made into charcoal

before the heat can reach the inside. The moisture is only heated, not evaporated, and makes the inside doughy or clammy; and butter, when spread upon the bread, cannot penetrate it, but floats on the surface in the form of oil, and the result is one of the most indigestible compounds.

The correct way is to have the bread stale and cut into thin uniform slices, and to dry it thoroughly before browning it. Such toast, even if moistened with water or milk, may be easily and thoroughly acted upon by the digestive fluids.

ICE-CREAM.

Some foods are more palatable when cold, especially in hot weather, and means are often used to make them very cold. This is done by freezing. Ice-creams — mixtures of cream, milk, eggs, sugar, and flavoring — and sherbets — or fruit and water ices — are often tempting to an invalid. They should be eaten slowly and in small quantity, or the digestive fluids will be too quickly chilled.

A patent freezer is a convenient article to have, but it is not a necessity, for a small quantity of cream may be frozen in a covered can or pail which is surrounded by broken ice and coarse salt.

Salt has a great attraction for water, and causes the ice to melt; and ice, in changing from a solid to a liquid, absorbs heat. The mixture of melted ice and coarse rock salt is many degrees colder than the ice alone; cold enough to reduce to the freezing-point the temperature of any substance placed in the ice and salt. The finer the ice is crushed the quicker it melts, and the more the mixture is stirred the sooner all parts become chilled.

NUTRITIOUS AND INNUTRITIOUS FOODS, AND THE PROPER PROPORTIONS OF FOOD.

Nutritious foods are those which contain substances that can be digested, absorbed into the blood, and assimilated or made a part of our bodies, and so promote growth and supply the waste.

Nutritious foods are nourishing or stimulating.

Nourishing foods are those that supply all the nutrition that the body needs, and develop perfectly every animal function, but do not increase the strength and rapidity of organic actions beyond the point of full nutrition.

Bread, vegetables, fruits, grains, sugar, salt, and water are nourishing foods.

Stimulating foods. All food that nourishes the body is in one sense stimulating, as it gives renewed energy to the bodily functions. But there are foods which impart more speed and energy to the organs than are necessary to perfect nutrition. Animal food is of this class. People who work, either with their brains or their muscles, wear out faster than people who only live and grow; and they need stimulating food to give the excess of energy that work demands, — not stimulants, but stimulating food. Stimulants are quite different.

Stimulants. Condiments and alcoholic drinks are classed as stimulants, because they impart no nourishment, do not make new tissue, nor help to remove the waste. They simply excite the bodily organs to greater activity for the time being, as a whip spurs an animal to greater speed; and the result is either greater weakness after the stimulating effect has passed, or a craving for these excitants that nothing else will satisfy. The

bodily functions are spurred to unnatural activity; and there is truth, in more senses than one, in the expression, "He is living too fast."

Innutritious foods are those which are not assimilated, which are by nature indigestible, or have been made so by improper combinations and modes of cooking.

The bran of wheat and other grains, the skins of peas, beans, and corn, the skins, cores, and seeds of fruit, heavy bread, soggy pastry, rich heavy cake, and all greasy fried food are either entirely unassimilated, and therefore do not nourish, or they are so difficult of digestion that some of the organs are excited to excessive action to rid the system of them, and so the digestive organs and, in time, the whole system suffer from being overtaxed. We often speak of food as digestible and indigestible, and many suppose that indigestible food should never be eaten. But there are some foods, portions of which are entirely indigestible and pass from the system unchanged and without causing any disturbance in the digestive canal. And it is evidently the provision of Nature that such foods should be eaten, for a certain bulk seems necessary in our food to stimulate a thorough action of the digestive fluids. If we do not eat enough to distend the stomach, so that the churning motion of the muscular coats can affect every part of the food, the digestion is imperfect. Or if the food be sufficient in quantity, but be wholly nutritious or highly condensed food, that is capable of entire absorption, the effect is too stimulating, and serious disorders of the alimentary canal are the result. To remedy this, it is generally necessary for persons in health, and who have strong digestion, to eat a certain amount of innutritious

food, which furnishes the bulk required and gives all parts of the digestive apparatus their proper amount of work to perform. While there is a marked difference in the length of time required for digestion by the various nutritious foods, there is often as great a difference in the digestive power of individuals, so it is impossible to prescribe the same diet for everybody. Milk is considered a wholesome food, and cheese is a cheap and nourishing food for laboring people; yet there are some persons who cannot take milk, and others to whom cheese is an active poison.

Many argue in favor of an exclusive vegetable diet because we can obtain from vegetables or grains all the necessary elements of food. No doubt many people eat too much animal food, but it is unwise to go to the extreme of excluding it altogether. The structure and conformation of the teeth and alimentary canal are equally well adapted to the digestion of animal or vegetable food or an admixture of both, and the highest degree of bodily and mental vigor is found usually among those who use a mixed diet. It was evidently intended by Nature that we should eat both animal and vegetable food, and until Nature's laws have been violated and our appetites perverted, it is safe to follow them in our choice of food. "A natural, healthful appetite for plain, wholesome food is the voice of the physical system making known its needs, and may always be trusted as an unerring guide to the proper choice of diet." But when we have to resort to condiments or stimulants to excite an appetite, we may be sure that something is wrong.

A fair proportion by weight is one third animal and two thirds vegetable food.

It has been estimated that an average daily diet should contain the different substances proportioned as follows: [1] —

Proteids,	.40 pounds.	Salts,	.10 pounds.
Starch, etc.,	1.00 "	Water,	6.00 "
Fats,	.40 "		

Suggestion to the Teacher.

For further information and receipts on cookery for invalids, see "Boston Cook Book," pages 407–413, and "Diet for the Sick," by Mrs. Henderson. Do not allow the pupils to make any dish in the lesson involving any principle not explained in this or previous lessons.

[1] See "The Chemistry of Foods and Nutrition," by Professor Atwater, beginning in the "Century," May, 1887.

RECEIPTS FOR LESSON IX.

Toast.

Cut stale bread in slices ¼ inch thick. Put it on a toaster or fork. Move it gently over the fire till dry, then hold it nearer until golden brown. Serve dry.

Water Toast.

Have a shallow pan with 1 pt. of boiling water and ½ tsp. of salt. Dip each slice of dry toast quickly in the water, then spread with butter and serve very hot.

Milk Toast.

1 c. milk, scalded.	½ tbsp. butter.
½ tbsp. cornstarch, or 1 tbsp. flour.	½ ssp. salt.

Melt the butter in a granite saucepan, add the dry cornstarch, mix well, add ⅓ of the milk, stir well as it boils and thickens, then add more milk, stir again, and when smooth add the remainder of the milk and the salt. Pour this between each slice of toast, and over the whole. If liked very soft, dip the slices first in hot salted water.

Eggnog.

Beat the yolk of one egg, add 1 tbsp. sugar and beat till creamy. Add ½ c. of milk. Beat the white of the egg till foamy (but not stiff and dry) and stir it in lightly.

1 c. of tea, or coffee, or beef tea may be added to make a variety.

Beef Juice.

½ lb. lean, juicy beef. Cut into quarter-inch dice. Put them in a wide-mouthed bottle, cover, and set on a trivet in a kettle of cold water. Heat gradually, and keep it simmering 2 h., or until the meat is white. Strain, press out all the juice, and season with salt to taste.

Ice-Cream for an Invalid.

½ c. cream.
2 tsp. sugar.
½ tsp. melted chocolate, or
1 tsp. coffee, or
2 tsp. fruit juice.

Put into a pint pail having a tight tin cover, or into a water-tight tin can. Beat with an egg-beater until foamy. Set this pail into a larger pail, and fill the space with snow, or fine ice, and salt. Turn the small pail back and forth, then open and scrape the cream from the sides. Cover and turn again. Repeat this until the cream is hard.

Blanc-Mange.

¼ c. Irish moss.
1 pt. milk.
½ ssp. salt.
½ tsp. vanilla.

Soak the moss in cold water till soft, pick over, wash, tie in a thin lace bag, and put it into the double boiler with the milk; boil until it thickens when dropped on a cold plate. Add the salt, strain, and add flavoring. Turn into a mould that has been wet with cold water.

Wheatena.

1 c. boiling water.
½ tsp. salt.
3 tbsp. wheatena.

Put the salt in the water. Add the meal and stir quickly. Boil 2 m. Eat with cream.

Questions on Lesson IX.

1. What do invalids need beside daintily prepared food?
2. What objectionable things are sometimes left in a sick-room?
3. What can you think of that would give comfort to an invalid?
4. What would cause them discomfort?
5. Is it ever well for us to do without food for a day or two?
6. What kinds of food are suitable in the beginning of sickness?
7. What are infusions?
8. Why do we infuse our tea instead of boiling it?
9. What foods are suitable when the system demands immediate nourishment?
10. What are the most easily assimilated foods?
11. Why do we toast our bread?
12. What is the proper way to prepare toast?
13. How do we freeze ice-cream without a patent freezer?
14. Why is melting ice colder than the ice itself?
15. What is the meaning of "nutritious"?
16. What are stimulating foods?
17. What are stimulants?
18. What foods are nourishing and not stimulating?
19. What is the after-effect of stimulants?
20. Is it necessary to eat some indigestible foods?
21. What proof have we that it was not intended we should confine ourselves to one form of food?
22. What is the best guide as to a choice in our diet?
23. How should food be proportioned in our daily diet?

LESSON X.

BROILING.

Broiling, from *bruler*, meaning "to burn," is cooking directly over the hot coals. It is the hottest form of cooking. The heat is so intense that the food would be quickly burned if allowed to remain continuously over the fire. We avoid burning by turning it frequently. This rapid cooking by such direct, intense heat combined with the action of the air, which has free access to the meat, gives a flavor quite unlike that obtained by cooking meat in water.

It is only certain kinds of meat that are suitable for broiling. A pound of beef cut in cubical form could not be cooked inside sufficiently without burning the outside. But the same weight of beef, if cut in the form of a slice about an inch thick, could be broiled perfectly, and would have a better flavor than when cooked in any other way.

Meat for broiling should have tender fibres, much juice, and but little fat, bone, or gristle. There is neither time nor moisture to soften tough fibres, and we learned in the first lesson on meat that water, and slow, long-continued heat are necessary to cook tough meat. If there be much fat it will melt, drip into the fire, and smoke the meat. Slices, cut from three fourths of an inch to an inch and a quarter in thickness, and taken from the thick part of the round, the rump, and the

sirloin, are the best for broiling. The tender parts of mutton may be broiled, but not veal and pork, for these need to be very thoroughly cooked. Very small chickens, some kinds of game and birds, tripe and liver, thin slices of ham and bacon, any small, thin fish, and oysters are also cooked by broiling.

The fire for broiling should be bright-red, but not blazing, and should be near the top of the fire-box. It should be made ready some time before it is needed that it may be in the proper condition at the last moment. There should be little or no flame, as that will smoke the meat. The oven damper should always be open during the broiling, that the smoke of the dripping fat, and the poisonous gases may be carried into the chimney. A bed of hard-wood coals is the best fire for broiling. Next to this is a charcoal fire. Wood gives an entirely different flavor to steak from that obtained by a coal fire. Some stoves for burning wood have a hearth in front into which the bright coals may be drawn for the cooking of the steak.

There is nothing better to use for broiling than a double wire broiler. Grease it with a bit of fat from the meat, or with salt pork, to keep the meat from sticking. Place the thickest part of whatever is to be cooked next to the middle of the broiler. If there is a fat edge on the steak, place this uppermost. Then, as the fat melts, it drips down over the meat, and by thus basting it keeps it from becoming too dry. Hold the broiler slanting down into the fire, and if there is a blaze do not lift the broiler up into the smoke, but keep it in the flame, turning it often. Use a coarse towel to protect the hand if the heat be very great.

In every form of cooking meat, where the meat itself

is to be eaten, we want to keep the juices in the meat; and this is especially important in broiling, for if not retained in the meat they drip into the fire. Do not salt the meat, as salt draws out the juices. Remove the bone and part of the fat. Place the meat close to the fire. The intense heat instantly sears the albumen and fibrin on that side, and starts the flow of the juices; as they become hot they rise; and if the meat be cooked long on one side they will force their way through the fibres, and form little pools on the surface of the meat, which run off and drip into the fire, and so we feed the fire with the best part of the meat. But if we turn the meat before the juices ooze out, this other surface is brought next to the fire and seared, and the juices cannot escape in that direction, so they rise again and try to get through the top. But that being already hardened they have to stay inside the meat. As the water of the juices is converted into steam by the heat, it expands and gives the meat a puffy appearance. If the meat be not turned often, or the broiling be carried on too long, these watery juices will gradually ooze between the fibres to the surface and be evaporated, leaving the meat dry, leathery, and indigestible.

Meat should be broiled only long enough to loosen all the fibres and start the flow of the juices. As long as there is juice inside, the steam will cause the meat to spring up instantly when pressed with a knife, and when it ceases to do this the juices have begun to evaporate, and the meat shrinks. When cooked it should be pink and juicy, not raw and purple, nor brown and dry. It should be so full of juice that when cut on the platter no other gravy will be required than its own hot savory juices.

Broiled food should be served very hot. All other dishes should be prepared first, the platter hot and the seasoning ready. Have a long shallow pan near to hold under the broiler when you remove it from the fire, and thus avoid dropping the grease on the floor. When everything else is ready, begin to broil, and do not leave the broiler an instant until the meat is cooked. Turn the broiler over every ten seconds, counting as the clock ticks, and always keep the broiler over the fire while turning, and not off over the stove or floor. If there be much fat, lift the broiler over the pan while turning, and let the fat drip into the pan. The burning fat will not smoke the meat if the meat be kept close to the coals, but if held on the top of the flame it will soon be smoked. After the first thorough searing hold the broiler farther from the fire. When the meat is done, rest the broiler on the pan; take the meat off carefully, without sticking the fork into it, and put it on the hot platter. Season with salt and, if desired, with butter and pepper, but it is much nicer with only salt. Wipe the edge of the platter before sending it to the table.

PAN BROILING.

It is sometimes inconvenient to broil over the coals, and nearly the same effect may be obtained by cooking in a dry, hissing-hot frying-pan. Heat the pan to a blue heat, and with a perfectly smooth pan no greasing is necessary. Sear the meat quickly on one side, then turn with a broad knife and fork, — without cutting into the meat, — and brown the other side, before any juice escapes into the pan. Cook from 4 to 8 m., turning twice, and add a sprinkling of salt just before the last turning.

Chops are much nicer broiled in this way than when broiled over coals, as the fat may be cooked till crisp, without becoming smoked, and the lean meat will not be over-cooked.

If the pan be hot enough and no fat used (and it seems difficult to convince some people that none need be used), this is not frying; it is broiling on hot iron; and the flavor and texture are very different from those of fried meat. If there be much fat on the meat it should be drained off as it melts.

The smaller and thinner the article to be cooked, the hotter should be the fire.

The larger the article, the more temperate the fire, or the greater the distance from the fire.

Meat, of close, compact fibre takes longer to soften and start the flow of the juices than meat of tender fibre.

TIME-TABLE FOR BROILING.

Steak, one inch thick	4 to 6 m.
Steak, one and a half inch thick	6 to 10 "
Small, thin fish	5 to 8 "
Thick fish	12 to 15 "
Chops, broiled in paper	8 to 10 "
Chickens	20 "

FIRST LESSON IN DOUGH.

Thus far in our lessons we have learned about only two ways of cooking the various grains which form so large and so important a part of our diet, namely, that of steaming the whole or broken grains, making a form of mush; and that of boiling them in a large quantity of liquid, making gruels.

Wheat, rye, corn, buckwheat, and some other grains

are ground coarse, and called meal, or fine, and called flour; and in these coarse or fine forms they are used in a great variety of ways, but always with water or some other liquid, for the same reason that we learned about in making mush.

These mixtures of moistened meal or flour are called *doughs* if the mass is only slightly moistened, and *batters* if enough liquid is used to make a mixture that will pour, or that can be beaten. *Dough* is from a word meaning "to wet or moisten;" and *batter* is from a word meaning "to beat."

Other ingredients are added to change and improve the texture and flavor, and then these mixtures are cooked in a great variety of ways, — boiling, steaming, baking, and frying. They may all be classed under the general names of breads, cakes, pastry, and puddings, and in one form or another are probably used in every family at every meal.

When properly combined and prepared they afford cheap, wholesome, and palatable forms of food. But their proper combinations involve so much knowledge of the principles of chemistry as applied to cookery, that we have purposely left the study of them till you shall have become familiar with some of the simpler forms of cooking.

Flour or meal, if merely wet, and then heated or cooked, will be dry, tough, and compact, and when eaten it will be difficult for the digestive fluids to penetrate the mass. To be digestible, doughs and batters must be light and porous. There are various ways of making them so. For the present we shall consider only one of these ways, as illustrated in our receipt for suet pudding, and that is by the use of baking-powder.

Baking-powder is a mixture of an acid salt (cream of tartar) and a carbonate of an alkali (soda), — substances which do not act upon each other when dry. We will put a teaspoonful of baking-powder in two tablespoonfuls of water and see what happens. A chemical action takes place, by which carbonic acid gas is liberated. This gas, as it tries to escape, fills the liquid, and causes effervescence. Soon the gas disappears and the liquid is still, and is neither acid nor alkaline, because the soda and cream of tartar have neutralized each other. But if there had been too much soda in the baking-powder the liquid would have had an alkaline taste, and if too much acid, an acid taste.

On account of the difficulty of measuring in the kitchen these two substances in the correct proportion, some manufacturers have mixed them by weight for us and called them baking-powders. And until you have learned more about cooking, it will be safest to use soda and cream of tartar in the form of baking-powder.

Now in making our pudding, if we put baking-powder in the flour, and mix it thoroughly, so that every particle of flour will have its share of the powder, when the flour is wet and made into dough carbonic acid gas will be liberated and try to escape, as it did from the water; but on account of the sticky and elastic nature of the gluten in the wheat flour, the gas cannot escape so readily, but will stretch and expand the dough and make it full of bubbles or air cells. Then, if the dough be cooked quickly, before the gas escapes, the starch grains will be ruptured by the combined effect of heat and moisture, the glutinous walls of the air cells will be hardened, and we shall have a light, porous loaf of pudding. Loaf is from the word *hlifian*, "to raise, to lift up."

This receipt also shows us how dough may be made more tender by the use of fat or shortening. Suet is one form of beef fat. It is used in doughs or flour mixtures to make them tender. It is a wholesome and economical form of fat, and particularly suitable for winter diet. By adding different flavoring ingredients, such as ginger, molasses, nutmeg, or fruit, we may make a variety of puddings with one formula.

Suggestion to the Teacher.

Broiling is an important lesson, and follows the lesson on Invalid Cookery, as it is the most wholesome way of cooking meat for invalids.

It will be impossible to give the pupils a lesson in roasting meat, either before the fire or in a hot oven; but by a thorough explanation of the action of heat in broiling the principles of roasting may be made clear. See "Boston Cook Book," pages 13, 14, 20, 21, 220–223, 233, 239, 246, 256, 257, 261, 263.

As the proper making of flour or dough mixtures is one of the most difficult forms of cooking, do not attempt to crowd much of it into one lesson. The action of baking-powder in the suet pudding, briefly explained, is enough for the first lesson.

RECEIPTS FOR LESSON X.

Broiled Steak.

Wipe, trim off the superfluous fat and remove the bone. Grease the gridiron with some of the fat. Broil over a clear fire, turning every ten seconds. Cook 3 or 4 m. if liked rare; longer, if well done. Serve on a hot platter, season with salt, and butter and pepper, if desired.

Mutton Chop. (*Pan Broiled.*)

Wipe, remove the pink skin and extra fat. Have a frying-pan hissing hot, without any fat; put in the chops and cook 1 m., turn and sear the other side, then cook more slowly until done, — 5 m., if liked rare. Stand them up on the fat edge to brown the fat, without over-cooking the meat. When nearly done sprinkle a little salt on each side. Drain on paper and serve very hot, on a hot dish, without a drop of grease.

Broiled Meat Cakes.

Chop tough, raw, lean beef quite fine. Season with salt, pepper, and a few drops of onion juice. Make it into small flat cakes and broil on a hot frying-pan. Spread with a little butter and serve very hot.

Plain Suet Pudding.

1 pt. flour.	2 oz. beef suet (4 tbsp. when chopped).
1 tsp. baking powder.	Cold water to make a soft dough.
1 ssp. salt.	

Mix the flour, baking-powder, and salt; add the chopped suet and mix it well. Add the cold water

gradually to form a soft dough. Grease a mould or several cups, fill to within an inch of the top, and cover with greased paper. Put them into a kettle of boiling water enough to come half way up the mould. Cover the kettle and steam 2 h. if in a mould, and 1 h. if in cups. Serve on a hot platter, and eat with hot gravy or a sweet sauce.

Ginger Suet Pudding.

Add to the plain suet pudding ¼ c. molasses and ½ tbsp. ground ginger. Serve with lemon sauce.

Fruit Suet Pudding.

Make the same as for plain suet pudding, adding to the dry ingredients: —

¼ c. currants.
2 tbsp. raisins.
2 sq. in. citron, sliced.
¼ c. sugar.
spk. nutmeg.

Boil 2 to 3 h.

Lemon Sauce.

2 c. hot water.
1 c. sugar.
3 level tbsp. cornstarch.
Grated rind and juice of 1 lemon.
1 tbsp. butter.

Mix the sugar and cornstarch thoroughly; add the boiling water. Cook 8 or 10 m., stirring often, add the lemon rind and juice, and the butter. Stir until the butter is melted, and serve at once. If the water boil away and the sauce become too thick, add more hot water till of the right consistency. By mixing the cornstarch with the sugar, the boiling water may be poured directly upon it without making it lumpy.

To Chop Suet.

Cut into small pieces, remove the membranes, shave each piece in thin slices, and chop on a board. Or, if a large quantity is to be prepared, sprinkle the pieces with flour, and chop them in a tray in a cold room. This will prevent the suet from becoming soft and sticky.

To Clean Currants.

Put them in a squash strainer, and sprinkle thickly with flour. Rub them well until they are separated, and the flour, grit, and fine stems have passed through the strainer. Then place the strainer and currants in a pan of water and wash thoroughly. Lift the strainer and currants together, and change the water and wash again until the water is clear. Drain between towels, then pick over carefully and dry them in a sunny place or between towels, but do not harden them by putting them into the oven.

To Stone Raisins.

Pour boiling water over them, a few at a time. When cool enough to handle, drain and rub each raisin between the thumb and finger till the seeds come out clean, then cut or tear apart, or chop if wanted very fine.

Questions on Lesson X.

1. What is the meaning of "broil"?
2. How does the degree of heat in broiling compare with other forms of cooking?
3. How do we avoid burning food when broiling it?
4. How should meat be cut, and what kinds of meat are suitable for broiling?
5. What kind of a fire is needed in broiling?
6. Why should the oven damper be open during broiling?
7. Why do we grease the gridiron?
8. How do you place the meat in the broiler?
9. Do we hold the meat over the flame or in the flame near the coals?
10. Why not cook the meat wholly on one side before turning it?
11. What is pan broiling?
12. What two ways of cooking grains have we learned about?
13. What are the grains called when ground?
14. Are there any other kinds of flour beside that made from wheat?
15. Why do we cook grains, whether whole or ground, in water?
16. What is dough?
17. What is a batter?
18. In what forms are flour and meal cooked?
19. What is the easiest way to make dough light?
20. What is baking-powder?
21. What is suet?
22. How do you prepare raisins, currants, and suet for cooking?

LESSON XI.

STEWS.

In the third and last way which we are to learn about of cooking meat in water, the object is to have the nutriment partly in the meat and partly in the water.

We use a small quantity of water, — less than in making soups, — and cook at a moderate heat for a long time. This mode of cooking is called stewing. The word means a slow, moist, gentle heat, — a sort of sweating. As some of the nutriment is to be in the meat we do not cut it as small as for soups, but into pieces convenient for serving. We put the bones, gristly portions, and the poorer parts of the lean meat into cold water. This draws out enough nutriment to enrich the broth. When the water boils we add the tender portions, that their juices may be kept in them. By this slow, steady simmering, rather than by fierce boiling, the fibres are softened, and the coarsest and cheapest kinds of meat are made tender and nutritious.

Any meat that is quite juicy and not very tough may be first browned on the outside to keep in the juices, and improve the flavor; but if you have any cold pieces of roast beef or steak, these may be used and will have the same effect. Some proteids are soluble in vegetable acids, like acetic acid, lemon juice, etc., so if coarse, tough pieces of meat are soaked awhile in vinegar, the fibres will be softened and the meat made more tender.

Pieces containing much gristle should be put into cold water. Cheap pieces of meat from the upper part of the shin, the aitch bone, the flank, the neck, and shoulder, are suitable for stews.

Fowls, tough game, the tougher parts of mutton, lamb, or veal, any meats which have been previously cooked, and any kind of large white fish may be stewed. Meat that has some bone and fat makes a richer stew. A great variety of economical, wholesome, and palatable dishes may be prepared as stews, and there are many names given to this form of cooking.

A *stew* usually has vegetables and dumplings cooked with the meat.

A *haricot* of mutton or any other meat is a stew with the meat and vegetables cut fine, — into small bits, the size of a haricot bean.

A *ragout* is a stew highly flavored with wine.

A *salmi* is a stew of game.

A *chowder* is a stew of fish.

A *fricassee* is a form of stewing where the meat is fried or browned in fat, either before or after stewing, and is usually served without vegetables.

A *pot pie* is a stew with the dough put on as a crust instead of in the form of dumplings.

Braising is a form of stewing usually done in a covered pan in the oven. The slow, uniform heat from the confined hot air in the oven gives a richer, stronger flavor than that obtained by stewing over the fire. The calf's heart as cooked in the fifth lesson was really a form of braising.

Onions, carrots, turnips, and potatoes are often used in a stew. Onions may be put in with the meat, but the other vegetables should be cut small, and added

about half an hour before the stew is done. The kettle should be drawn forward, that the water may boil, not simmer, while the vegetables are cooking. This will not harm the meat as it would if boiled rapidly at first. Remove the bones and fat before adding the vegetables.

A dumpling is a small ball or portion of dough dropped or dumped quickly into the boiling liquid. There should be only liquid enough to come nearly to the top of the meat and vegetables, that the dumplings may rest on them and not sink into the liquid. The steam from the savory broth will cook the dumplings and impart a richer flavor than that obtained when they are cooked in a steamer over the stew. Cover the kettle closely, as soon as the dumplings are in, and let the stew boil steadily ten minutes, without lifting the cover. Serve them at once. These dumplings are another form of dough made on the same principle as the pudding in the last lesson. As they are to be eaten with meat they require no shortening. The same dough may be cut into small cakes and baked as biscuit.

Suggestion to the Teacher.

In this, as well as in other lessons where there is some time between the first and last steps in the preparation of a dish, it will be well to give the class practice in sharpening the knives, polishing the tins, etc. All this work has to be done, and must be taught. Do not feel that all the time must be spent in cooking. See "Boston Cook Book," page 226.

RECEIPTS FOR LESSON XI.

Beef Stew.

½ lb. beef.
½ onion.
¼ c. turnip, cut in half-inch dice.
¼ c. carrot, diced.
2 potatoes.
Salt and pepper.
Flour.
Water to cover.

Wipe the meat, cut it into small pieces, and remove all the fine crumbly bones. Put the larger bones and tough meat into the kettle and cover with cold water. Melt the fat in a frying-pan, dredge the tender meat with salt, pepper, and flour, and brown it in the hot fat. Brown the sliced onions also, then put the meat and onions into the kettle. Add boiling water to cover. Simmer from 2 to 3 h., or till the meat is tender. Half an hour before serving remove the fat and bones, and add the other vegetables. Pare the potatoes, cut them into quarters, parboil them 5 m., then add them to the stew. Cook 20 m. When ready to serve, skim out the meat and potatoes, put them on a dish, thicken the gravy if needed, add more seasoning, and ½ c. of strained tomato if desired. Pour the gravy over the meat.

Dumplings.

1 pt. flour.
½ tsp. salt.
2 tsp. baking-powder.
1 scant c. milk.

Mix the dry ingredients, stir in the milk gradually to make a soft dough. Drop quickly by the spoonful into the boiling stew, letting them rest on the meat and potatoes. Cover closely to keep in the steam, and cook just 10 m., without lifting the cover. Serve at once.

Biscuit.

Make the same as for dumplings, and if liked shorter rub ½ tbsp. of lard or dripping into the flour. Mix just as soft as can be handled easily, turn the dough out on a floured board, pat it down with the roller until ½ inch thick. Cut in small rounds and bake in a very hot oven.

Baked Apple-Sauce.

Fill a deep pudding-dish with apples, quartered, pared, and cored. For 1 qt. of apples allow ½ c. of sugar and ½ c. of water. Bake, closely covered, in a very moderate oven several hours, or till dark-red.

Stewed Prunes.

Wash carefully, and if hard and dry soak 1 h. before cooking. Put them in a granite pan and cover with boiling water. Simmer, closely covered, until swollen and tender. Add 1 tbsp. of sugar for 1 pt. of prunes, cook 5 m. longer, and set away to cool.

Questions on Lesson XI.

1. What is the most economical way of cooking meat?
2. What is stewing?
3. How do we prepare the meat for stewing?
4. What parts of meat are to be put into boiling water?
5. What into cold water, and why?
6. Can a stew be made of cold steak or roast beef?
7. How may we make tough meat tender before stewing it?
8. What kinds of meat are suitable for a stew?
9. What is a haricot; a ragout; a salmi; a chowder; a fricassee; a pot pie?
10. What besides meat do we put into a stew?
11. What are dumplings, and how do you make them?
12. What are the important points to remember in cooking dumplings?

LESSON XII.

FIRST LESSON IN BATTERS.

Batters are thin mixtures of flour and liquid made in the proportion of one scant measure of liquid to one full measure of flour. If merely mixed and cooked slowly they would be hard and compact. But they are made light by the admixture of air or gas and by quick cooking before the air has a chance to escape.

Air at 70° expands to about three times its volume when exposed to the temperature of a hot oven. So, as the mixture heats in cooking, the expansion of the air in the batter makes it light and porous.

We entangle air in batters by beating the mixture thoroughly, as in whole-wheat gems; by beating air into eggs, and using the beaten eggs in the mixture, as in pop-overs; and by the air or gas obtained by the union of an acid with an alkaline carbonate, as in the use of baking-powder in the griddle cakes. Sometimes we may use newly fallen snow. The expansion of the snow as it is changed to water, and then to steam, lightens the batter, if used quickly.

As it is important that batters be baked at once before the gas escapes, it is always well to see that the fire is in the proper condition, and to have the pans and ingredients ready before you begin to put the materials together, that there may be no needless delay.

The general rule for mixing all batters is to mix the salt and baking-powder (if that is to be used) with the flour, beat the eggs, add half the liquid to the beaten eggs, and stir this gradually into the flour, then add the remainder of the liquid, beat all thoroughly, and bake quickly. When the expression "beat the eggs separately" occurs in a receipt it means beat the yolks and whites separately.

This lesson illustrates two of the ways of mixing, namely, stirring and beating. Also the simplest way of cooking in hot fat.

Stirring. We *stir* simply to blend or mix two or more materials. In mixing dry materials, stir or move the spoon round and round in the materials till you cannot tell one from another. In mixing dry materials with liquids, add the liquid gradually, and stir slowly at first to avoid spattering. Be sure that the bowl of the spoon — not the edge nor the tip merely — touches the bottom and sides of the bowl. This is mashing as well as stirring, and the mixture soon becomes a paste. When perfectly smooth, add more liquid till you have the desired consistency. We *stir* flour and water together for a thickening, and we *stir* flour and butter and milk for a sauce, but when we wish to add air to the mixture, we *beat.*

Beating. Tip the bowl slightly, and hold the spoon so that the edge scrapes the bowl, and bring it up through the mixture, and over with a long quick stroke to the opposite side; under and up through again, lifting the spoon out of the mass, cutting clear through, and scraping from the bottom at every stroke. We beat eggs and batters and soft doughs. The albumen of the eggs and the gluten of the flour, owing to their

viscidity or glutinous properties, catch the air and hold it in the form of bubbles, something as we make soap bubbles by blowing air into soapy water. The faster we beat, and the more we bring the material up from the bowl into the air, the more bubbles we have; but one stirring motion will break them. So in any mixture where we wish to obtain all the air possible we must be careful to beat and not to stir.

Thin batters, like gems made without eggs, and popovers should be beaten vigorously just before baking. Batters require to be baked in a hot oven, but if it be too hot, the sudden expansion of the air bursts the bubbles, and the mixture falls.

All the mixtures we are to make to-day are to be cooked in iron or tin, and we grease the dishes to keep the mixture from sticking. The fat on the dish heats quickly, and so helps to cook the outside of the mixture, and this heat gives a flavor and texture to the crust different from those of the inside; and the greater heat of the fat on the hot griddle gives a crust different from that obtained by baking in the oven. There the crust that comes in contact with the greased pan is unlike the top crust which had no fat in contact with it, and all these crusts are unlike that of the steamed pudding, because they have been subjected to greater heat. The brown color and the flavor of crusts are probably caused by the change of some of the starch into dextrine.

Cooking on a greased griddle is a two-sided baking, — first on one side, then turning and baking the other side. It is one form of cooking with hot fat, and from carelessness, too much fat is often used. It is called frying; but true frying is immersion *in* hot fat. A "well

greased griddle or pan" is one greased uniformly, — not a daub here and there, nor masses of grease in the corners, but just a thin coating of fat laid uniformly over the entire surface. Any more fat than enough to prevent the food from sticking is unnecessary, and is absorbed by the food, making it unwholesome.

Very thin batters, or those containing eggs and sugar, require more fat than other kinds; but stiff doughs like pastry and plain cookies often need none.

Suggestion to the Teacher.

In these lessons on batters and doughs the general principles should be clearly explained, for these are really the most intricate forms of cooking. Much depends upon the heat of the oven, and experience is the best teacher in determining this. See "Baking," page 153. The quality of materials will vary, and though definite proportions are given in many of the receipts, the teacher must use judgment, and change them if necessary. See "Boston Cook Book," pages 80–107.

RECEIPTS FOR LESSON XII.

Griddle Cakes.

1 c. flour.
1 ssp. salt.
1 tsp. baking-powder.
1 c. sweet milk (scant).
1 tsp. melted butter.

Sift flour, baking-powder, and salt together. Add the milk, using enough to make a batter about like thick cream. The amount will vary with the quality of the flour, and the surest way is to fry a spoonful, and add more liquid if the batter be too thick to run easily on the griddle, and more flour if they spread too much or will not hold their shape in turning. Add the butter last. Pour from the end of a large spoon on a hot, well-greased griddle. When one side is full of bubbles turn the cakes over and brown the other side until it stops puffing.

One egg may be used, but it is not necessary. With sour milk, use ½ tsp. soda and omit the baking-powder, and with sour cream, omit the butter. Half flour and half fine white corn meal, or whole-wheat flour may be used.

Whole-wheat or Graham Gems.

½ c. Graham flour.
½ ssp. salt.
½ c. milk or water.

Mix salt with flour, add liquid gradually till smooth. Beat thoroughly. Drop by spoonfuls on a hot, well-greased griddle, or bake in hissing hot, buttered gem-pans, 30 m.

Pop-overs.

1 c. flour.	1 c. milk.
1 ssp. salt.	1 egg.

Mix the salt with the flour, add half of the milk slowly, and when a smooth paste is formed, add the remainder and the egg beaten thoroughly. Beat well before filling the pans. Cook in hot, buttered gem-pans, or earthen cups, in a quick oven half an hour, or until the puffs are brown and well popped over.

Snow Pancakes.

½ c. flour.	½ c. milk.
1 ssp. salt.	1 hp. tbsp. snow.

Mix the same as Graham gems, and after beating well, fold in the snow (which must be freshly fallen). Cook like large griddle cakes, and when done spread them with sugar or jam and roll them over and over.

Questions on Lesson XII.

1. What are batters?
2. Why should batters be light and porous?
3. How does air make a batter light?
4. How are pop-overs made light?
5. What do we use in the griddle cakes to make them rise?
6. Why should batters be cooked soon after they are mixed?
7. What is the proportion of flour and liquid for a batter?
8. What is the difference between stirring and beating?
9. How do you mix a batter?
10. When do we stir, and when do we beat, a mixture?
11. Why do we grease a dish in which a batter is to be cooked?
12. What causes the differences in crusts of anything cooked on a griddle, in the oven, and by steam?
13. How many kinds of griddle cakes may be made?
14. How could you vary the pop-overs?

LESSON XIII.

THICKER BATTERS, MUFFINS, AND DOUGHNUTS; ROLLING AND FRYING.

THERE are several degrees of thickness in batters. Thin batters are about the consistency of thin cream; thick batters are like thick cream; still thicker batters are stiff enough to keep their shape when poured from a spoon. Any batter is a pour batter until it is made so stiff that it breaks in the pouring and drops from the spoon. Then we call it a drop batter. So long as it is soft enough to be beaten it is a batter, but when a spoon can no longer be made to go through it easily, with a beating motion, it is a dough. Doughs may be of any thickness, from "just stiff enough to be shaped," or "as soft as can be handled easily," to those that are so stiff that they may be rolled thin as a wafer. It is better to become familiar with the proper consistency of batters and doughs by learning these descriptions, than to trust to such phrases as these, — "stiff as pound cake," "soft as ginger-bread," etc., which one often hears.

Muffin mixtures are thicker than the batters we learned to make in Lesson XII. The general proportion is one scant measure of liquid to two full measures of flour. The proportions will vary somewhat according to the thickness of the liquid — cream, milk, or water — and the thickening quality of the meal or flour.

This lesson shows us another way of obtaining carbonic acid gas to lighten batter, namely, by the union of soda with molasses. Old-fashioned molasses (not syrup) contains acetic acid, and when it is mixed properly with soda, carbonic acid gas is liberated, and the soda is neutralized.

Soda may also be neutralized by the lactic acid in sour milk. In using soda with any acid, care must be taken to use the correct proportion, so that no alkali may be left, as any excess of alkali hinders digestion.

As the amount of acid in sour milk varies, it is often difficult to know how much soda to use. Sour milk is best when it sours quickly and becomes thick and solid. Then the proportion is 1 even tsp. of soda to 1 pt. of milk. When the milk is so old that it becomes watery and separates, or has a mouldy scum on the surface, it is unfit to use.

In winter, milk grows bitter before it sours, and often tastes sour but is not thick. Then it may be used as if it were sweet milk, with baking-powder, or in gingerbread or brown bread where you have molasses to complete the acidity.

Some people dissolve the soda in water, but as some of the gas escapes as soon as the soda is wet, a better way is to mix the soda with the flour, or other dry ingredients. Soda becomes lumpy in keeping, and should always be finely pulverized before it is measured, and then sifted through a fine wire strainer, and thoroughly mixed with the flour. Then when the liquid is added, the chemical action takes place in the dough, and none of the gas is lost, provided the mixture be quickly cooked.

Cream of tartar, made from the crystals which collect

in wine casks, is the most convenient acid to use with soda; for it unites with soda only when heated, and the gas therefore is not all liberated until the mixture is in the oven. Unless you have pure cream of tartar, it is safer to use a reliable baking-powder.

The proportion of soda and acids is as follows: —

1 level tsp. soda and 2 slightly rounding tsp. cream of tartar for 1 qt. of flour.
1 level tsp. baking-powder for each cup of flour.
1 level tsp. soda to 1 pt. of thick sour milk.
1 level tsp. soda to 1 c. of molasses for batters.
½ tsp. soda to 1 c. of molasses for stiff doughs.

In any receipt where soda is to be used with cream of tartar you may substitute baking-powder, in the proportion of one level teaspoonful of baking-powder to each cup of flour or meal.

Where only a small amount of carbonic acid gas is desired, it is safer to use baking-powder, as it is more accurately measured than fractions of a spoonful of soda and cream of tartar.

In preparing all kinds of batters and soft doughs, which are made light with soda and an acid, mix the dry ingredients in one bowl; then mix the liquids with the beaten eggs, stir this quickly into the dry mixture; add the butter, melted, and when these are thoroughly mixed, bake or fry immediately.

ROLLING.

Soft doughs which are to be cut into shapes should be mixed as soft as can be handled easily, then tossed out lightly on the floured board until they are well floured, patted with the rolling-pin until half an inch thick, then cut with a floured, sharp-edged cutter.

Stiff doughs which are to be rolled very thin, like cookies, etc., require about four measures of flour to one of liquid. Roll only a small portion at a time, and roll with a light quick stroke, not bearing down hard enough to make the dough stick. Cut the shapes close together and put the scraps with another portion, knead them slightly, just enough to make a smooth mass, then roll again. In rolling any soft dough, use enough flour to prevent sticking, but no more, and be sure that the dough does not stick. When it has adhered to the board, always scrape it off before adding more flour.

Flour the roller, and keep that and the board free from lumps of dough.

FRYING.

Frying is cooking in hot fat. To be done properly there should be fat enough to float the articles to be cooked, or in some instances to cover them. Lard and dripping may be used, and as they often contain water they should be heated until all the water is evaporated. So long as there is water in them they can be made no hotter than boiling water, and they will bubble and sputter until the water has all evaporated. It is useless to attempt to cook anything in the fat until it is still. Clear fat may be made very hot, but for cooking purposes it is never boiling hot, as some receipts indicate, as it would burn before it reached that point. When it smokes in the centre as well as on the edge it is about 385°, and is hot enough for the quickest kind of frying.

For flour mixtures like the doughnuts we are to make to-day, it is better to test the heat with a bit of the mixture. It should rise at once to the surface, swell, and

begin to brown on the under side. The hot fat hardens the gluten in the dough, and forms a crust through which the fat cannot penetrate; but if the fat be not hot enough, the dough will soak the fat and the cakes will be greasy.

If too great a proportion of soda be used, more than can be neutralized, doughnuts will soak the fat. It is not extravagant to use eggs in doughnuts, as the albumen in the eggs hardens quickly, and helps to keep out the fat, and thus makes them more wholesome.

Drop cakes, or fried muffins, are mixed soft, and dropped from a spoon into the fat, and shape themselves in cooking. They will also turn over when half done. Doughnuts are mixed stiff, rolled and cut into different shapes, and must be turned over in the fat.

After every frying, as soon as the fat is slightly cooled, strain it through a fine cloth into a pail. Never set it away to harden in the frying kettle without straining it, for the flour or crumbs which settle on the bottom will burn easily when it is heated again, and will adhere to anything that may be fried in it.

Suggestion to the Teacher.

For further information see "Boston Cook Book," pages 14–17, 80–82, 102; Williams's "Chemistry of Cookery," pages 84–110.

RECEIPTS FOR LESSON XIII.

General Directions.

Have the pans ready and greased, if necessary, the fire in good condition, and all the ingredients at hand before you begin to put together. By measuring dry things first, then the liquid, one cup will do for all, without washing. Beat the eggs in a small bowl, and use some of the liquid (milk or water) to rinse the egg from the bowl. Measure accurately, and use every grain of dry material and every drop of liquid. Scrape all the dough from the bowl, but never scrape the dough from the knife on the edge of the pan. Put it into the spoon, and then from the spoon into the corner of the pan. Fill the mixing bowl with cold water if not ready to wash it immediately, but if an egg-beater be used, wipe it at once with a damp cloth and then with a dry one.

Corn Cake.

1 c. flour.
½ c. fine yellow corn meal.
¼ c. sugar.
½ tsp. salt.
1 tsp. cream of tartar.[1]
½ tsp. soda (mashed fine).
1 c. sweet milk; if sour milk be used, omit the cream of tartar.
1 egg.
1 tbsp. butter or dripping.

Mix the dry ingredients thoroughly in the order given. Add the milk with the egg (well beaten), and the melted butter last. Beat well and bake in muffin-pans, or a shallow pan in a hot oven about 20 m. This cake is very good without the egg, and when it is to be eaten with meat the egg is unnecessary; but when this is the most substantial part of the meal, the egg should be used.

[1] Use 2 tsp. baking powder in place of soda and cream of tartar if preferred.

Rye Muffins.

1 c. rye meal (sifted).
1 c. white flour.
¼ c. sugar.
½ tsp. salt.
2 tsp. baking-powder.
1 egg.
1 c. milk.

Mix the dry ingredients thoroughly. Beat the egg, add the milk, and stir quickly into the dry mixture. Bake in hot gem pans, 25 m.

Ginger-bread.

½ c. molasses
½ tbsp. ginger
¼ tsp. salt.
½ tsp. soda.
1 tbsp. dripping.
¼ c. boiling water.
1 c. flour.

Sift the ginger, salt, and soda into the molasses, add the dripping softened; beat well, add the boiling water and flour. Beat thoroughly and bake in a shallow pan in a hot oven about 20 m.

Soft Molasses Cookies.

½ c. molasses.
½ tsp. salt.
½ tbsp. ginger.
½ tsp. soda.
1 tbsp. warm water.
¼ c. dripping, softened.
Flour to mix soft enough to be rolled.

Roll out ⅓ inch thick, cut with a small round cutter, and bake about 10 m. Handle as little as possible, and do not use much flour.

These may be made into balls, and placed some distance apart on a greased tin, then flattened with the bottom of a round tin box.

Wheat Crisps.

¼ c. cream.
1 tbsp. sugar.
spk. salt.
½ c. fine granulated wheat flour, or enough to make a stiff dough.

Mix quite stiff, knead well, roll out thin as a wafer, cut with a small round cutter, and bake on ungreased tins in a very hot oven.

Fried Rye Muffins.

¾ c. rye meal.
¾ c. flour.
½ tsp. soda (mashed fine).
1 tsp. cream of tartar.[1]
1 tbsp. sugar.
1 ssp. salt.
1 egg.
½ c. milk.

Mix the dry ingredients thoroughly, beat the egg, add the milk, stir this into the dry mixture. Take up ½ tbsp. on the end of a spoon, and with a knife scrape it into the hot fat. Cook until the muffins will not stick when tried with a fork.

Doughnuts.

1 pt. flour.
¼ c. sugar.
½ tsp. salt.
½ tsp. soda (mashed fine).
1 tsp. cream of tartar.[1]
½ ssp. cinnamon.
½ to ¾ c. milk.
1 egg.
1 tsp. butter (melted).

Mix in the order given, add ½ c. of milk to the beaten egg, and use enough more milk to make the dough as soft as can be handled. Take a small portion at a time, roll out ⅓ inch thick, and cut with a ring cutter. Put the scraps with another portion and roll again. When all are rolled, fry in deep hot fat. Turn when brown, and when done drain on paper or in a colander.

[1] Use 2 tsp. baking powder if preferred.

Questions on Lesson XIII.

1. What is the consistency of a thin batter?
2. What are some of the terms used to designate the thickness of batters?
3. What is the proportion of flour and liquid in muffin mixtures?
4. In how many ways may we use soda in cooking and obtain carbonic acid gas?
5. How much soda should be used with 1 pt. of sour milk?
6. How much with 1 tsp. of cream of tartar?
7. How much with 1 c. of molasses?
8. Why is it better to mix the soda with the flour rather than to dissolve it?
9. Why should soda be finely pulverized?
10. What is cooking soda?
11. What is cream of tartar?
12. What should be the proportion of baking-powder to one cup of flour?
13. How would you roll soft doughs?
14. What is frying?
15. What kinds of fat may be used?
16. How may you tell when fat is hot enough for frying?
17. Why should fried food be drained?

The combined amount of the old-style measurement of one level teaspoon of soda and two slightly rounded teaspoons of cream of tartar, and the fraction of cornstarch or rice flour which is a necessary ingredient of pure baking powder, would be from four to five level teaspoons. This is the average amount for one quart of flour for biscuits, making the amount for one cup of flour a trifle more than one level teaspoon. Mixtures that are rich in butter require a trifle more, as it is harder for the gas to lift up a dough heavy with fat; and those that have eggs to help make them light, require slightly less than this proportion. Use always as little as will make the dough light, and as flours vary and baking powders vary, the right amount must often be determined by experience. Too much baking powder gives a salty taste, causes doughnuts to soak fat and makes cake too porous.

LESSON XIV.

BREAD.

BREAD is a form of food made from the meal or flour of certain grains.

The word is derived from the verb "to bray or pound," expressive of the old method of preparing the grain. Bread is therefore made of something brayed, as brayed wheat or corn. The brayed grain is moistened and made into dough; various substances are used to raise the dough, and the raised mass is stiffened by the heat in cooking, and thus held in shape, and becomes a loaf.

Bread is made principally from wheat flour, because wheat is the only grain which contains the right proportion of gluten essential to the making of light, spongy bread. Rye used alone makes a moist, close, sticky bread. Corn meal alone makes too dry and crumbly a loaf, but either of these grains may be used to advantage with wheat.

The gluten of wheat is a tough, gray, elastic substance, consisting chiefly of vegetable fibrin. It will swell to four or five times its original bulk. Wheat also contains a large amount of starch, and more mineral matter than any other grain. When the whole of the nutritious part is used, wheat is the most useful food we have, but fine white flour contains only a portion of the desirable elements.

Bread is sometimes made by using soda and an acid to make the dough light; but these mixtures are usually

baked in small forms, and called biscuit, muffins, etc. In all these methods there is no chemical change in the flour; the dough is simply made light by the gas from the soda.

But the perfect loaf of light, spongy bread is made by a process quite unlike anything we have studied about, and that is, by the addition of a ferment which causes chemical changes in the flour.

A ferment is some albuminous substance in a state of change or decomposition, and when introduced under proper conditions into any other albuminous substance, in however minute a quantity, causes a change or fermentation in the whole mass.

The germs of these ferments are always present in the air, and when any substances which are rich in sugar, starch, and gluten are exposed to air, warmth, and moisture, these ferments cause a change by which new compounds are formed.

There are several kinds of fermentation. *Lactic fermentation* is the change in milk when it sours.

Alcoholic fermentation is the change in fruit juices when preserves ferment, or when wine is made from grape-juice, cider from apple-juice, and beer from grains.

Acetic fermentation is caused by allowing alcoholic fermentation to go on too long, or in too warm a place, as when cider changes to vinegar.

In lactic and acetic fermentation, a sour taste is developed; but in alcoholic fermentation, if not carried too far, there is no unpleasant taste, since the acid produced is carbonic acid gas, which goes off into the air; and as a large amount of carbonic acid gas is formed, this kind of fermentation is most suitable for bread making; the

object being not to produce alcohol, but to puff up the dough and make the bread light.

Wheat flour contains starch and gluten, and a ferment called diastase, and if moistened and kept warm it would in time change, or ferment; but when this change takes place slowly the dough will be sour. This change may be hastened by the addition of a ferment or some albuminous substance which has already begun to change, and which will leave no unpleasant taste. The ferment commonly used is yeast.

Yeast, in its natural state, when viewed under the microscope is found to be a plant or germ of the fungus tribe, of which mould, mildew, etc., are familiar forms. It is one of the simplest and smallest forms of vegetable life. Each little cell has an albuminous skin or membrane, and contains liquid or sap. These cells are found in fruit juices and sprouting grains, and they bud off from each other, and expand rapidly when they are exposed to air and warmth, and in this change or growth they decompose the sugar. But they can be made to grow even more rapidly, and this is what happens when yeast, which is made from sprouting grains, is added to anything containing starch or sugar. Grains which contain starch and gluten are moistened and left for these ferment germs or yeast cells to grow for a while; then the fermentation is checked, and they are prepared in various ways for keeping, and sold under the forms of dry, liquid, and compressed yeast. But the life of the yeast cells is not destroyed, and they will grow again when exposed to warmth and moisture, and given food to live upon; the same as other forms of vegetable life, after being kept for a time, will grow when planted in proper soil. The temperature of boiling water will

kill the yeast plant, and so we must be careful, in using yeast, to have the proper temperature. In making bread, we put yeast with the flour, moisten it, keep it warm, and we have just the food and conditions necessary to waken the yeast plant into life again. The yeast cells begin to grow in the dough, and in thus growing they cause a change in the flour. The diastase ferments and causes some of the starch to change into a kind of sugar; the sugar changes into carbonic acid gas and alcohol. In converting the starch into sugar in the dough, there is no change evident to the eye, but as soon as the sugar is changed to carbonic acid gas and alcohol, large bubbles of gas appear. The gas, being lighter than the dough, rises, and in its efforts to escape puffs up the gluten, and as the gluten is very elastic it can stretch to several times its original bulk. It is on account of the peculiar tenacity or power of the wheat gluten to hold the gas that wheat flour makes the lightest bread. The gas fills the dough with minute air cells, which — if the yeast have been uniformly mixed with the flour — make it light and spongy. When this expansion has reached the desired limit, — that is, before the alcoholic fermentation has changed to the acetic and soured the dough, or the tough, glutinous walls of the air cells are broken, making large, unequal holes, — we check the fermentation by baking the dough in a hot oven. The alcohol escapes into the oven, the starch is swollen and ruptured, and absorbs water, some of the starch is changed to gum and forms the crust, which by the intense heat assumes a brown color.

In yeast bread the chemical change in some of the starch is similar to the change which takes place in

starch during digestion, namely, its conversion into sugar. This gives a sweet, nutty flavor and a light, spongy texture, very different from those of soda bread. It is, when properly made and baked, usually considered the most wholesome form of bread.

THE HEAT FOR BAKING.

The heat of the oven for baking is a very difficult matter for a beginner to determine. There are no rules that can be strictly followed in every case. Testing the heat by a thermometer is not always practicable. Testing by the length of time one can bear the hand in the oven will vary with every hand that tries it. Much depends upon the construction of the stove, the condition of the fire, and the nature of the fuel. You may learn to judge of the oven in this stove, but your stove at home may be different, and the same rules will not apply to both.

Experience is the best teacher, and by care in observing and comparing results, much may be learned. Study carefully your own stove, and remember which kinds of fuel give a quick, flashing fire, and which a steady, long-continued heat. Observe the amount of fuel needed to produce greater or less heat in the oven. Learn how to increase the heat quickly or gradually, or to diminish it as the case may require. Also how to detect the difference between a fire that is bright red on top but all ashes underneath, and one that is a solid bed of glowing coals. Test the oven by opening the door quickly, and notice how the heat puffs out into your face, or see how long you can keep your hand in the oven.

Compare the heat when there is a quick, blazing fire

and all the draughts are open, with that when there is a large body of fire and the dampers are closed, and still again with that when there is but little fire. In this way make your own standard of a *very hot*, a *hot* and a *moderate* oven.

The general rules are as follows: — Rolls, biscuit, breakfast-cakes, puff paste, game, and small pieces of meat, require a very hot oven, and quick baking, — half an hour or less. Have a bright fresh fire of clear glowing coals, all through. Large pieces of meat, poultry, etc., require a *very hot* oven at first. After five or ten minutes check the fire. Have sufficient body to the fire to last the required time without replenishing, or if that be impossible, add a little fuel often that the heat may be kept uniform.

Bread, pastry, and fish require a hot oven. Cakes, ginger-bread, puddings, etc., a moderate oven.

Flour mixtures and other things that have to rise in the oven, require heat from underneath to help in the rising, and should be placed on the bottom of the oven, with the rack underneath, if there be danger of burning. If the oven be too hot on the top they will brown before rising. A pan of water on the middle rack, or a paper hood over the pan, will prevent them from browning too fast. See page 205, Lesson XIX.

Meat requires more heat above than below, and should be placed on a rack in the pan, with the oven rack or another pan underneath the dripping-pan to prevent burning the fat in the pan. In some stoves the heat may be turned away from the bottom of the oven. Small pieces of meat, scalloped dishes, and other things which require only a browning of the surface, may be placed on the rack near the top of the oven.

The old notion that you must not look at anything in the oven is erroneous, and until you have learned by experience how to regulate the fire and oven, it is better to look at things as they are baking, and turn and watch till you are sure they can be left without further care. But look for only an instant at a time. Cultivate the habit of opening and shutting the oven door quickly but gently.

TIME-TABLE FOR BAKING.

Baking Bread, Cake, and Puddings.		*Baking Meats.*	
Loaf bread	40 to 60 m.	Beef, sirloin, rare, per lb.	8 to 10 m.
Rolls, biscuit	10 to 20 "	Beef, sirloin, well done, per lb.	12 to 15 "
Graham gems	30 "	Beef, rolled rib or rump, per lb.	12 to 15 "
Ginger-bread	20 to 30 "	Beef, long or short fillet,	20 to 30 "
Sponge cake	45 to 60 "	Mutton, rare, per lb.	10 "
Plain "	30 to 40 "	Mutton, well done, per lb.	15 "
Fruit "	2 to 3 hrs.	Lamb, well done, per lb.	15 "
Cookies	10 to 15 m.	Veal " " "	20 "
Bread pudding	1 h.	Pork " " "	30 "
Rice and tapioca	1 "	Turkey, 10 lbs. wt.	3 hrs.
Indian pudding	2 to 3 "	Chickens, 3 to 4 lbs. wt.	1 to 1½ "
Plum "	2 to 3 "	Goose, 8 lbs.	2 "
Custards	15 to 20 m.	Tame duck	40 to 60 m.
Steamed brown bread	3 hrs.	Game "	30 to 40 "
Steamed puddings	1 to 3 "	Grouse	30 "
Pie crust	about 30 m.	Pigeons	30 "
Potatoes	30 to 45 "	Small birds	15 to 20 "
Baked beans	6 to 8 hrs.	Venison, per lb.	15 "
Braised meat	3 to 4 "	Fish, 6 to 8 lbs.; long, thin fish	1 h.
Scalloped dishes	15 to 20 m.	Fish, 4 to 6 lbs.; thick halibut	1 "
		Fish, small	20 to 30 m

Suggestion to the Teacher.

This lesson should be combined with the following one. Morning classes should mix the bread and make the pastry as given in Lesson XV.

Afternoon classes bake the bread and prepare the warmed over potatoes. Follow the same order the next week.

For full information about bread and yeast, see "Boston Cook Book," pages 36–76. "Food Materials and their Adulterations," by Mrs. Richards, pages 150–156. "Chemistry of Cookery," by M. Williams, pages 194–210.

RECEIPTS FOR LESSON XIV.

YEAST.

1 large potato.
1 tbsp. hops (loose).
1 pt. boiling water.
1 hp. tbsp. flour.
1 hp. tsp. sugar.
1 hp. tsp. salt.
¼ tsp. ginger.
½ yeast cake or ½ c. yeast.

Wash, pare, and soak the potato. Steep the hops in the water. Mix the flour, sugar, ginger, and salt in a large bowl. Grate the potato into the flour mixture. Let the hop water boil briskly for 1 m., strain it over the potato, and mix quickly. If it does not thicken like starch place it over the fire for a few moments. If too thick add boiling water till thick as cream. When lukewarm or at 70° add the yeast. Rise in a warm place till frothy. Beat it down every ½ h. Bottle and keep cool.

BREAD.

1 c. water or milk (lukewarm).
½ tsp. salt.
½ tsp. sugar.
¼ c. yeast or ⅛ yeast cake dissolved in ¼ c. water.
3 to 3½ c. flour.

Put the salt, sugar, and yeast in the mixing bowl, add the water, and when the sugar is dissolved add about 3 c. of the flour and mix with a knife. Add more flour till stiff enough to knead. Turn it out on a floured board, and knead till it is soft and elastic and can be worked without any flour. Put it back in the bowl, cover with a cloth and tin cover, and let it rise in a warm place (80°) till double its bulk (over night in winter, 3 or 4 h. in summer). When light, work it over in the bowl, doubling it over from the edges to the centre of the bowl until smooth. Let it rise again till

double its bulk, then divide into two parts, shape into round or long loaves, or into biscuit. Once more let it rise, closely covered, till double its bulk. Bake in a hot oven (400° or 12 seconds by the hand). Bake a loaf 40 to 60 m., biscuit from 10 to 20 m.

One third white flour and two thirds brown flour may be used in the same way, but without kneading. Brown flour means any good flour prepared from the whole grain. The Health Food Company's fine granulated wheat flour and some other brands, are improved varieties of what was formerly called Graham flour.

Questions on Lesson XIV.

1. What is the meaning of bread?
2. From what grains is bread made?
3. Why does wheat make the best bread?
4. What is gluten?
5. What is fermentation?
6. How is bread dough made light?
7. How many kinds of fermentation?
8. What is yeast?
9. What conditions are necessary to enable yeast to grow in flour?
10. What change takes place in the flour when yeast is added to dough?
11. How can we tell when dough is risen enough?
12. What happens if it should rise too long?
13. Why do we bake bread?
14. What foods require to be baked in a very hot oven; a hot oven; a moderate oven?
15. What kind of a fire do we need for quick baking?
16. What for baking meat?
17. What for baking puddings?
18. What is pastry?
19. How do you make plain pastry?
20. What would you do if anything baked too rapidly?
21. What are the objections to pastry as food?
22. Can it be made in a wholesome manner?

LESSON XV.

THE CARE OF FOOD.

YOUR instruction would not be complete if we omitted to tell you how to take care of food, both before and after cooking, and how to prevent the waste that is so often occasioned by lack of such knowledge.

It is a well-known fact that all albuminous substances when exposed to the air soon pass into a state of decomposition, or putrefaction. Milk sours; eggs, fish, and meat putrefy; fruits and vegetables decay; butter, fat, and oils become rancid; preserves ferment; meal and flour become musty, and bread and cake mouldy. It is therefore quite important to know how to care for our food, so that it may be kept in good condition as long as possible.

As it is air, moisture, and warmth that occasion the change in food, these must be excluded. So it is well to have our store-rooms in a cool and dry part of the house, and to keep many of our materials in air-tight cans or jars. But even with all these precautions much food will be lost unless it is examined daily.

Nearly all groceries, such as rice, tapioca, raisins, meal, and grains of all kinds, are best kept in large, wide-mouthed bottles or jars. These are easily cleansed, and the contents are plainly seen, and may be kept air-tight. Small jars or bottles are suitable for soda, cream of tartar, spices, and other articles usually purchased in small

quantities. Air-tight tin cans are suitable for tea, coffee, crackers, etc. Covered buckets are convenient for flour and sugar.

Keep the jars and boxes clean on the outside, and when they are empty, or at regular intervals, cleanse the inside. Be careful never to handle them with sticky or floured fingers.

Do not put moist articles in tin. Do not keep anything in paper bags; they break easily and give a very untidy appearance to a pantry. Empty the bags as soon as the stores are sent in from the market. Fold the bags and put them away neatly to use for other purposes.

Do not keep milk in a tin can. Pour it into a large-mouthed pitcher or jar, or into a shallow pan. All dishes in which milk is kept must be thoroughly washed first in cold water, then in hot suds and scalded with clear boiling water and dried perfectly, or the milk will sour quickly. Keep anything that has a strong odor away from milk, cream, or butter, as these articles absorb odors readily.

Fruit should be kept uncovered in a cool, dark place. Examine it often and remove all decaying portions.

Salt fish has a disagreeable odor, and it should be cut into small portions and packed in glass jars. Onions and other strong vegetables should be kept covered in a dark cool place, and where there are no other foods.

Lemons should be put into a jar and covered with cold water, with a saucer over them to keep them under the water. They will keep fresh and juicy for a long time. The water must be changed twice a week. Lemon and orange peel may be dried and grated, or put into alcohol and used for flavoring. Cranberries may also be

kept for some time, if covered with cold water. Extracts, spices, etc., should be kept air-tight that their strength be not wasted.

Meat and fish should be examined as soon as they come from the market and be wiped all over with a damp cloth. Then put them on a plate, never in paper, in a cool dark place, not on the ice, but near it. In warm weather examine the meat carefully, particularly in the folds and crevices, as sometimes there are minute eggs on it. The marrow, or soft, fatty substance, should be removed from the backbone in mutton and lamb; also the pink skin over the fat, and the thin shiny membranes under the chops and steaks, as these spoil quickly and then taint the whole piece.

Fresh vegetables should also be examined daily.

Dripping and other fats should be re-melted often, as they keep better in a solid than in a broken form.

Eggs should be wiped as soon as brought in, and the shells may then be used for clearing coffee.

Cooked food should not be shut up tightly when hot.

Clean and scald the bread and cake jars every other day, and never let the crumbs and broken pieces accumulate in the jars.

Remnants of food should never be put away on the large table dishes, but on small ones kept for that purpose. They should be utilized in some way as soon as possible. In preparing a breakfast or lunch see what use you can make of the "left overs" before you decide on using new material.

Cooked vegetables will sour quickly in hot weather, especially if seasoned with butter or milk. It is better to cook in small quantities and have just enough, than to have large portions left over.

Keep everything in a pantry absolutely clean; the shelves washed and wiped dry, the crumbs removed; the molasses jug outside, free from stickiness; the lard and dripping pail free from grease. And be sure that no rancid fat, or wormy meal, or mould, or anything objectionable be allowed to remain there.

Inspect the refrigerator daily, and clean the spout and pan as well as the inside.

Suggestion to the Teacher.

The chapter on the Care of Food is inserted here merely as a matter of convenience. The information contained in it should be given in connection with the foods as they are used in the various lessons.

RECEIPTS FOR LESSON XV.

Pastry.

1 hp. c. pastry flour.
1 ssp. baking-powder.
1 ssp. salt.
1 tbsp. dripping or butter.
1 tbsp. lard.

Sift flour, salt, and baking-powder together, and rub or chop in the dripping. Mix quite stiff with cold water (¼ c. or more). Turn out on a floured board, pat into a flat cake, roll out ¼ inch thick, and spread the lard over the surface. Sprinkle with flour, fold over and over, and roll out again into a long narrow strip. Then roll over and over like a jelly roll, and cut off from the end as needed. This receipt makes just enough for two crusts for plates of the usual size. Divide the dough into two parts, turn each half over on the side and pat into a round shape. Then roll uniformly, keeping the shape circular till it will fit the plate.

Pies with no Under Crust.

Make all fruit pies in a deep earthen dish and without an under crust. Fill the dish with fruit, add sugar and cold water. Cut a strip of paste ½ inch wide, wet the edge of the dish, lay the strip of paste on the wet edge, wet the paste, then cover with a piece of paste the size of the top of the dish, press the edges gently, trim and bake in a hot oven about 30 m., or until the fruit is soft

Apple Pie.

Wipe and cut sour apples in quarters, remove the cores and skins, and cut each quarter in two pieces

lengthwise. Allow 1 tbsp. sugar for an ordinary apple, and if not juicy add ½ tbsp. water.

Rhubarb Pie.

Wash and cut the stalks into inch-pieces. Allow ½ c. sugar and ¼ c. water to each c. of fruit.

Pies with no Upper Crust.

Line a shallow plate with the paste, let it come ½ inch over the edge, turn the paste under to fit the plate, and make a scalloped edge by pressing it with the right forefinger between the thumb and finger of the left hand; or roll the crust to fit the plate, wet the edge, and lay a narrow strip of paste on the rim.

Squash Pie.

1½ c. squash.	½ tsp. salt.
1 c. boiling milk.	1 ssp. cinnamon.
½ c. sugar.	1 egg.

Use a dry mealy squash, stew and sift it, then add the other materials. Bake 30 m., or until it puffs up all over.

Custard Pie.

3 eggs.	1 ssp. nutmeg.
3 tbsp. sugar.	3 c. scalded milk.
1 ssp. salt.	

Beat the eggs until light, add sugar and salt, and beat again; add spice and scalded milk. Strain into the plate. Bake slowly, and the moment it puffs and a knife-blade comes out clean it is done.

Pies with Two Crusts.

Mince and other pies which are to have both upper and under crusts should be baked on flat or very shallow plates.

Roll each crust to fit the plate that there may be no waste. The upper crust may be rolled a trifle larger, and the fulness thrown back into the centre to allow for the shrinking in baking. Make several holes in the upper crust of meat pies to let the steam escape.

Plain Mince Pies.

1 c. meat.
2 c. apples.
1 tsp. salt.
1 tsp. cinnamon.
1 tsp. allspice.
1 c. brown sugar.
½ c. raisins.
½ c. currants.
1 c. of sweet-pickle vinegar, or
½ c. water and juice of
2 lemons.

Use any remnants of cold steak or beef, which have been simmered till tender. Chop fine, the meat, apples, and the stoned raisins. If you have no sweet-pickle vinegar boil the plain vinegar, sugar, spice, and raisins together for 10 m. Then add the other materials and cook until the apples are soft.

Lyonnaise Potatoes.

1 pt. cold boiled potatoes.
½ tsp. salt.
½ ssp. pepper.
1 tbsp. minced onion.
1 tbsp. dripping.
1 tbsp. chopped parsley.

Cut the potatoes into half-inch dice and season with salt and pepper. Fry the onion in the hot dripping until light brown, add the potato. Stir with a fork till they have absorbed the fat. Add the parsley and serve hot. 1 tsp. of vinegar gives the potatoes a good flavor.

Creamed Potatoes.

1 pt. cold potatoes.	1 tbsp. butter.
½ c. milk.	½ tsp. salt.
spk. pepper.	1 tsp. chopped parsley.

Cut the potatoes into dice or thin slices. Put the milk into a shallow pan, and when hot add the potatoes and cook until they have absorbed nearly all the milk. Add the butter and seasoning, cook 5 m. longer, and serve hot.

Questions on Lesson XV.

1. How may cold boiled potatoes be utilized?
2. What is parsley?
3. What happens to our food if it is left exposed to air and moisture?
4. How should groceries and dry materials be kept?
5. Why not keep moist articles in tin?
6. Why should canned food be poured at once from the cans when opened?
7. Are paper bags suitable to keep food in?
8. Why is it better to keep milk in a shallow pan rather than in a can?
9. How are lemons and cranberries best kept?
10. Shall we keep butter and onions in the same closet?
11. How often shall we examine the bread and cake jars?
12. Why should we clean the pan and spout of a refrigerator?

LESSON XVI.

THE ADAPTATION OF FOOD TO AGE, OCCUPATION, CLIMATE, AND MEANS.

We have learned that we need a variety of food in our daily diet, and that the selection of food should be determined by the state of health, and by individual digestive power. Age, occupation, climate, and our means, should also influence our choice.

Children and growing persons need the most nutritious food, and plenty of it at regular intervals, but nothing stimulating or exciting. They should be required to take sufficient time for eating, and should be taught to masticate everything slowly and thoroughly. They should eat milk, whole-wheat and corn-meal bread, oatmeal, farina, wheatena, and hominy mush; plenty of ripe fruit, raw and stewed fruit sweetened.

They may have a small portion of beef, mutton, venison, or poultry, either roasted, broiled, or boiled; baked potatoes, asparagus, lettuce, celery, and spinach; green peas, beans, and sweet corn provided every hull be first broken or cut. They may eat eggs sparingly, either plain or in omelets and custards; plain sponge cake and ginger-bread; ice-cream, if eaten slowly and not too hard and cold; simple puddings made of fruit and bread, tapioca or farina; plain molasses cookies, whole-wheat cookies and wafers.

Children should avoid eating hot bread and griddle cakes; fried meats, fried cakes or doughnuts; any highly seasoned food, rich gravies, rich pastry and cake; pickles and preserves; sago, arrow-root, and other starchy foods except when combined with milk, eggs, or fruit, and eaten with cream and sugar; raisins unless stoned and cooked three hours; and especially veal and pork. They should not drink tea, coffee, or any other stimulant.

Milk should enter largely into the diet of children. It contains caseine or flesh-forming material, cream and sugar, which are heat producers, mineral salts for the bony structure, and water as a solvent for all the other materials necessary in nutrition. It should be taken slowly and with rolls or mush, or sipped by the spoonful. Milk as taken into the stomach is a fluid, but as soon as it meets the acid of the gastric juice, it is changed to a soft cheese-like substance. If a large portion of milk be swallowed suddenly it will form a lump of dense curd which rolls over and over in the stomach like a heavy weight, and as the gastric juice can only attack its surface, it digests slowly. But if taken slowly, the curd forms in small lumps which break up easily every time the stomach turns them over, and the gastric juice readily dissolves them.

All children have a fondness for sugar, which is natural and should be gratified in moderation, rather than repressed. Do not give them candy, cake, and sweetmeats, however, between meals; but give them occasionally, as a part of the dessert, either pure block sugar, maple sugar, or simple home-made candies.

Aged people should have a diet much like that of children, only less abundant. They should eat in small quantities often and regularly, and eat only plain whole-

some food that may be easily digested. Many of the ills of old age might be avoided by a simple diet.

Adults may have a variety of wholesome food cooked in different ways and adapted to their occupation.

Occupation. If the occupation tax the muscular strength use muscle-making food; not wholly meat as many suppose, for you will see by the charts that there are many foods that contain as much as, or more, proteid matter than meat, namely, peas, beans, cheese, and some grains.

Those who labor or exercise in the open air need a large quantity of wholesome food, and it need not be the most digestible, as they require food that will stay by them.

Persons engaged in sedentary occupations, or who take little exercise and live in close, confined rooms, cannot digest as much, or as easily as those who labor out of doors. They should have food that contains a great amount of nutriment in a small compass, and it should be prepared in the most digestible form. Those who tax their brains severely, should have some animal food, and the most digestible forms of starchy and warmth-giving food, and avoid any excess of fat.

Climate and Season. People who live in cold climates find it necessary to consume large quantities of fat in the form of blubber oil and oily fish, as a protection against the severe cold.

Those in extremely hot climates live on rice with a small amount of olive oil, flesh, or fish.

Animal food is a better diet for cold weather than for hot. Fat is not digested easily unless some exercise be taken. It is therefore a suitable winter diet for laboring people. Fruits, vegetables, and grains eaten with

milk, butter, or oil furnish the carbo-hydrates needed in summer.

Means. People who have only limited means should choose the foods that contain the greatest amount of nutriment for the least money.

It will be seen by the charts that corn meal, whole-wheat flour, oatmeal, dried peas and beans are

THE CHEAPEST FOODS.

Indian corn is used in many forms. Some varieties which contain a large proportion of sugar are eaten green from the cob as a vegetable. The whole grains, hulled, are eaten as samp, or hulled corn; broken grains of various sizes, as hominy; the ground grains, as either coarse or fine meal. Cornstarch, a very fine powder, is prepared from Indian corn. Meal grows musty very quickly when ground by the old process, owing to the moisture of the corn and the heat of the stones. In the new-process, or granulated meal, the corn is first dried for two years, then ground into coarse grains like sugar. Corn meal, when cooked, is best made into small loaves or cakes and eaten hot. It is rich in nitrogen, and contains more fat than the other grains. This causes it to attract the oxygen from the air, and spoil rapidly. It should be purchased in small quantities. It is suitable for a winter diet and is a cheap, wholesome food, adapted to strong laboring people, and to those who are deficient in natural warmth; but it is heating for persons with weak digestion, and should not be given to scrofulous children, or to invalids when there is any inflammatory condition of the system.

Oatmeal is highly nutritious, being richer in nitrogen

than any other grain; but as it does not contain a tough, adhesive gluten, like wheat, it is not easily made into fermented bread. Its nitrogenous matter resembles caseine more than gluten, and is called *avenin* (from *avena*, "the oat"). It is used as a mush or porridge, eaten with sugar and milk. It is rich in food for muscle and brain, useful for children and laboring people, but irritating to many people whose digestive powers are weak.

Rye meal and flour are used, more especially in New England, in the form of bread and mush. Rye is sweeter than wheat, and makes a moist bread which can be kept for some time without becoming hard and unpalatable. Rye should be purchased in small quantities, kept in a cool dry place, sifted and examined thoroughly before using.

Barley is used in soups and sometimes in gruels. It cannot be made into good bread, as it has too little gluten. It is nutritious, being rich in phosphates. It contains starch and mucilage, and in the form of gruel makes a soothing drink in fevers. The husk is removed, the grains are ground and polished, and then it is termed *pearl barley*.

Buckwheat has less flesh-forming and more heat-giving elements than wheat. It is therefore suitable only when used in cold weather and by those who labor hard or exercise freely. It is used principally in the form of griddle-cakes. These should be eaten sparingly and not be depended upon for nourishment. Children should never eat them. The custom of making a breakfast of buckwheat cakes and syrup has been the cause of years of indigestion with many people.

Rice contains very little of the flesh-forming element. It has more starch and less fat than any other grain.

It is cheap, and is largely used by people in very hot climates. It should always be used with milk, eggs, or some fatty substance, and is a suitable summer diet. When rice is cooked in a large quantity of water, some of the nitrogenous and mineral constituents, of which rice has but a small amount, are lost in the boiling water, and unless the water be used for soup, to boil rice is a wasteful process. Steaming is a much easier method and more economical.

PEAS AND BEANS.

The seeds of leguminous plants, such as peas and beans, contain a large proportion of albuminoids in the form of vegetable caseine. They are deficient in fat, but rich in mineral matter.

They are used in the green unripe state as a fresh vegetable. They should be cooked in soft water, using just enough to soften them, and when done the water should boil nearly away, and the little that is left should be served with the vegetables that all the soluble matter may be saved. Green peas and beans are easily digested if the hulls are broken by a fork or the teeth, but if swallowed whole none of the digestive fluids can penetrate the hull, and serious illness often results.

The dried varieties are less digestible than the green, and need long, slow cooking in water to render them suitable for food. They contain a bitter substance, which may be removed by soaking and changing the water.

As they are deficient in potash salts, some authorities recommend adding a small amount of bicarbonate of potash to the water in which they are cooked as well as

to that in which they are soaked. This makes them more soluble.

Peas are used for soups or purées; the split peas are better than the whole, for the hull being removed they are more easily cooked and more digestible. Dried beans are used in soups, bean porridge, and baked with pork.

Suggestion to the Teacher.

Much valuable information may be given to the pupils, by means of the charts and museum, but as all schools will not be furnished with these aids to instruction the teacher should thoroughly inform herself, and teach the pupils at each lesson respecting the composition of food, its cost, and the amount of nutriment as proportioned to the cost.

RECEIPTS FOR LESSON XVI.

Split-pea Soup.

½ c. dried split peas.
3 c. cold water.
½ tbsp. butter.
½ tbsp. flour.
½ tsp. sugar.
½ tsp. salt.
1 ssp. white pepper.
Milk to thin it.

Pick over and wash the peas. Put them with the cold water on the back of the stove. Let them soak ½ h. then simmer 2 h. or until soft. Rub them through a fine strainer, and put on to boil again. Add milk or water to make it like a thick soup. Cook the flour in the hot butter, and add it to the strained soup when boiling. Add the seasoning, and serve with croûtons or crisped crackers.

A small slice of onion may be boiled with the peas. When there is sufficient time the peas should be soaked before cooking.

Scotch Broth.

½ c. pearl barley.
2 lbs. neck of mutton.
2 qts. cold water.
¼ c. each of carrot, turnip, onion, and celery.
2 tbsp. butter or dripping.
1 tbsp. flour.
2 tsp. salt.
1 ssp. white pepper.
1 tbsp. chopped parsley.

Pick over, and soak the barley over night or several hours in cold water. Wipe the meat with a clean wet cloth. Remove the fat and skin. Scrape the meat from the bones and cut it into half-inch dice. Put the bones on to boil in 1 pt. of cold water, and the meat in 3 pt. of cold water. Let the latter boil quickly, and after it has boiled 20 m. skim off the fat, and then add the barley. Cut the vegetables into ¼ inch dice, fry

them 5m. in 1 tbsp. of the butter, and add them to the meat. Simmer 3 or 4 hours, or until the meat and barley are tender. Strain the water in which the bones have simmered. Cook 1 tbsp. of butter in a saucepan with 1 tbsp. of flour. When smooth, add the strained water gradually, and stir into the broth. Add the salt, pepper, and parsley. Simmer 10 m. and serve without straining.

Steamed Brown Bread.

1 c. corn meal.
1 c. rye meal.
½ c. wheat flour.
½ tsp. salt.
½ tsp. soda.
¼ c. molasses.
1 ½ c. sweet milk.

Mix meal, flour, and salt. Mash the soda, sift it into the meal, and mix thoroughly. Add the molasses and milk, then beat well and turn into a greased mould, cover and steam 2½ h. Or use small cups, cover with greased paper, and steam 1 h.

Scalded Corn Cake.

½ c. fine white corn meal.
1 ssp. salt.
Boiling milk, or water enough to scald it.

Mix the meal and salt. Stir in boiling milk until the meal is all swollen and the mixture is thick enough not to spread when put on the griddle. Grease the griddle with salt pork fat, drop the mixture on with a tablespoon. Pat the cakes till about ⅓ of an inch thick. Cook them slowly, and when browned put a few drops of fat on the top of each cake and turn them over. When the other side is browned serve them, and eat with syrup or in the place of bread with meat.

Fried Corn-meal Mush.

1 c. corn meal.	1 c. cold milk.
½ tsp. salt.	1 pt. boiling water.
½ tbsp. flour.	

Mix the meal, salt, and flour, and wet the mixture with the milk. Stir it gradually into the boiling water. Stir often, and after 10 m. cook it over boiling water for 30 m. Then turn it into a wet bread-pan, and when cool cut in half-inch slices. Cut each slice in two pieces and dip them in flour. Fry several slices of breakfast-bacon or salt pork, drain them, fry the mush in the fat, and serve the bacon with the mush.

Questions on Lesson XVI.

1. What kinds of food are suitable for children; old people; for those who labor in the open air; for those who work with their brains; for those who live in cold climates?
2. How should milk be taken?
3. How are beans and peas used?
4. What are some of the cheapest foods?
5. In how many forms is Indian corn used?
6. What is its value as food?
7. How is rye meal used?
8. What is the best way to cook rice?

LESSON XVII.

POULTRY.

The flesh of poultry has less red blood and is drier than the flesh of animals. It is not marbled with fat, and as it abounds in phosphates it is valuable food, particularly for invalids. The fibres are not closely connected by tough membranes, and are therefore easily separated and digested.

The best chickens have soft yellow feet, short thick legs, smooth moist skin, plump breast, and the cartilage on the end of the breastbone is soft and pliable.

Pin feathers always indicate a young bird and long hairs an older one. Old fowls have long thin necks and feet, and sharp scales; the end of the breastbone is hard, the flesh has a purplish tinge, and there is usually a large amount of fat.

To Prepare a Fowl for Cooking.

Pick out the pin feathers, remove the hairs by singeing over a blaze, and wipe with a damp cloth. Cut off the head, slip the skin back from the neck and cut the neck off close to the body, leaving skin enough to fold over on the back. Remove the windpipe, pull the crop away from the skin on the neck and breast and cut it off close to the body.

Never cut the skin on the breast to remove the crop, but take it out from the end of the neck. Cut out the

oil bag in the tail. Make an incision near the vent, insert two fingers, loosen the fat from the skin, and separate the membranes lying close to the body. Keep the fingers up close to the breastbone until you can reach in beyond the liver and heart, and loosen on either side down toward the back. This will enable you to avoid breaking the gall bladder which lies on the left side under the liver. When the membranes are all loosened, clasp the fingers round the gizzard and draw everything out. The kidneys and lungs will not come with the others, and must be looked for in the hollows near the backbone and between the ribs. Wipe the chicken inside and outside with a damp cloth.

If the chicken is to be baked or boiled whole fill the skin where the crop was with stuffing, and put some inside the body. Skewer or tie the legs and wings close to the body.

If the chicken is to be broiled split it down the entire length of the backbone, before removing the entrails.

If to be stewed or fricasseed, cut off the legs and wings at the joints. Cut from near the vent through the membrane lying between the end of the breastbone and tail, down to the backbone, on either side. Then remove the entrails. Break off the backbone just below the ribs, cut through the cartilage dividing the ribs, and separate the collar-bone from the breast.

To clean the giblets: Slip off the thin sac round the heart and cut out the veins and arteries. Remove the liver and cut off all that looks green near the gall bladder. Be careful not to break the gall bladder. Trim off the fat and membranes from the gizzard, cut through the thick part, open it and remove the inner lining without breaking it. Cut off all the white gristle and use only

the thick fleshy part. The trimmed gizzard, liver, and heart are all that are used. Wash and soak them in cold water, then stew them until tender.

VEAL.

The fat of veal should be white and clear, and the lean meat pink or flesh-color. White veal, or that from a calf less than six weeks old, is unfit to eat. Veal has but little juice, flavor, and nutriment, but as the fibres are tender and it contains much gelatine, it is a favorite food with many people. It may be cooked in a variety of ways and is made palatable by the addition of proper seasoning and savory sauces. It should always be thoroughly cooked, as under-done veal is not wholesome. It should never be depended upon for nourishment, but may be used occasionally to give a variety.

Suggestion to the Teacher.

This will be an expensive lesson if a whole fowl be used for each of ten lessons, therefore I would suggest that two fowls be purchased and made to serve for five lessons each. If three can be afforded, use two for four lessons each, and the third one for the last two lessons. Keep one fowl whole as long as possible to use for illustration. Singe half of the fowl and show how to remove the crop, oil bag, and entrails, and the kidney and lung from one side.

The pupils have learned how to prepare stuffing in the fifth lesson; but it will be well to show them where and how to stuff a fowl, and also how to truss it for baking, but do not have them bake it.

From the half of the fowl that has been cleaned take off the leg and wing, and use these for a fricassee in the first lesson. Use the other leg and wing in the second lesson.

The second day split the fowl down the back and use half the breast and half the back for each of the third and fourth lessons. Use the second fowl in the same way for the next four lessons, and for the fifth day use half the third fowl at each lesson. This will enable you to have at each lesson a whole fowl or half of one for illustration, and show how to bake a fowl and also how to make soup and fricassee at each lesson.

Proportion the receipt for the chicken soup and fricassee, according to the amount of fowl used. Simmer the portions of fowl until tender, brown them in hot fat, and serve on toast or not, as you please. Reserve part of the broth and put it with the bones and boil again for soup. For the soup use as much milk as chicken broth, boil it, thicken with flour in the proportion of ½ tbsp. of flour to 1 c. of liquid and season to taste with salt and pepper. Serve with croûtons or crisped crackers.

This lesson may be given as a dinner and the pupils may have some practice in estimating its cost (see table of cost of food, pages 223–225), and may become familiar with the time required for its preparation, and with the proper order of work.

In the spring classes, veal may be substituted for chicken, cream rice pudding for the scalloped apple, steamed rhubarb for the cranberries, and lettuce for the cold slaw.

RECEIPTS FOR LESSON XVII.

Chicken Fricassee.

Clean the chicken, and at the joints cut into pieces for serving. Cover with boiling water, add 2 tsp. salt and 1 ssp. pepper.

Simmer till the meat is tender. Remove the large bones and cook them again in the water. Dredge the meat with flour and brown in hot dripping. Put on toast on a hot dish.

Strain the broth, and remove the fat. To 1 c. chicken broth add 1 c. milk and thicken with 2 tbsp. flour cooked in 1 tbsp. butter, as directed for white sauce. Add more salt and pepper if needed, and 1 ssp. celery salt and 1 tsp. lemon juice.

Veal Fricassee.

The ends of the ribs, the breast, the neck, and the smaller part of the knuckle may be utilized in a stew or fricassee.

Cut the meat, 2 lbs., in small pieces and remove all the fine crumbly bones. Dredge with flour and brown it in dripping or salt pork fat. Cover the meat with boiling water, skim as it begins to boil, and add 2 small onions, 1 tsp. salt, and 1 ssp. pepper. Simmer until very tender. Remove the larger bones, add a flour thickening and more seasoning if necessary. Cook 10 m., add ½ c. of milk and 1 tbsp. of butter.

Potatoes and dumplings may be cooked with the veal if a stew be desired.

Cranberries.

1 c. cranberries.	¼ c. cold water.
½ c. sugar.	

Pick over and wash the cranberries, put them in a granite saucepan, sprinkle the sugar on top of them, pour on the water, and after they begin to boil cook them 10 m., closely covered, and do not stir them. Push them down with a wooden spoon if they are inclined to boil over. The berries will be tender, will jelly when cold, and are much nicer than when sifted.

Steamed Rhubarb.

1 c. rhubarb.	½ c. sugar.

Wash the rhubarb and cut into inch-pieces. Put it into a granite double boiler, sprinkle the sugar over it and steam until soft. Do not stir it.

Cabbage or Cold Slaw.

1 c. shaved cabbage.	1 egg.
1 tsp. salt.	½ c. milk.
½ tsp. mustard.	1 tbsp. butter.
spk. cayenne.	¼ c. vinegar.
1 tbsp. sugar.	

Trim off the decayed leaves, cut into quarters, soak awhile in cold water, drain, cut off the hard stalk, then slice or shave it off in thin strips. Mix the salt, mustard, cayenne, and sugar, add the beaten egg, the milk, butter, and vinegar. Cook it in a small saucepan over the fire, or in a double boiler, stirring constantly until it thickens like a custard. Pour it while hot over the cabbage and set away to cool.

Lettuce.

Pick off each leaf and wash it separately in cold water; remove any decayed portions, drain and arrange in a deep dish, the outside leaves on the edge and the inner ones in the centre. Serve with salt, pepper, oil, and vinegar, and sugar if preferred, or with a dressing like that given with cold slaw.

Scalloped Apple.

¼ c. sugar.
¼ ssp. cinnamon.
¼ lemon rind grated.
¼ c. butter.
1 c. soft bread crumbs.
3 c. sliced apples.

Mix the sugar, cinnamon, and lemon rind. Melt the butter and stir it into the crumbs. Butter a pudding-dish, put in ¼ of the crumbs, ½ of the apple, and sprinkle with ½ of the sugar. Then put in another layer of crumbs, apple, and sugar and the remaining half of the crumbs on the top. If the apples are not very tart add the lemon juice to each layer; and if they are not juicy add ¼ c. of cold water. Bake slowly, covered at first, and when the apples are soft remove the cover and brown the crumbs. Serve with cream.

You may use ripe berries in place of the apples, and oatmeal or wheat mush in place of the bread crumbs.

Cream Rice Pudding.

2 tbsp. rice.
2 tbsp. sugar.
½ ssp. nutmeg.
2 c. milk.
spk. salt.

Pick over and wash the rice. Put it in a shallow baking-dish. Dissolve the sugar and salt in the milk,

add the nutmeg, and pour it over the rice. Bake slowly the first half hour, stirring often, then increase the heat and cook until the rice is tender and slightly browned. Serve hot with butter. Raisins may be added, if preferred.

Questions on Lesson XVII.

1. How does the flesh of poultry differ from that of animals?
2. How would you prepare a fowl for a fricassee?
3. What parts of a fowl are not used as food?
4. Why should veal be thoroughly cooked?
5. How do cranberries grow?
6. How should they be cooked?
7. What part of a plant is rhubarb; lettuce; cabbage?

LESSON XVIII.

FISH.

Fish, on account of its abundance, cheapness, and wholesomeness, is invaluable as an article of food. It is pound for pound less nutritious and less stimulating than meat, but is rich in phosphorus and has a large proportion of nitrogenous material. The white varieties, like flounder, halibut, cod, and haddock, have the oil in the liver, and are the cheapest and most digestible. Red-blooded fish, like salmon, mackerel, and blue-fish, have the oil distributed through the body, and the flesh is dark. They are nutritious for those who can digest them, but they are too rich and oily for invalids.

Fish should be perfectly fresh and thoroughly cooked, or it will be very indigestible and sometimes poisonous. The flesh of good fresh fish is firm and hard; if not fresh it will be soft and flabby.

Fish, after being dressed at the market, should be cleaned by scraping, if necessary, and by wiping with a cloth wet in cold salted water. As they are slippery to handle, dip the fingers into salt while dressing them.

Fish may be cooked in a variety of ways, but broiling and baking are the most wholesome methods. Small fish and pieces of large white fish are good if fried, but oily fish should never be fried.

Suggestion to the Teacher.

It will be impossible in twenty lessons to give more than one lesson on fish; but several ways of cooking may be shown from one fish, then, by following the general directions as given in the receipts, the pupils may cook any kind of fish at home.

For the lesson: Procure a haddock, weighing 2½ or 3 lbs., also a cod's head. Have the fish cleaned, but left whole. Show how it may be stuffed and prepared for baking. Then cut off the head and end near the tail, and reserve them with the cod's head for a chowder. Cut off the thick end as far down as the opening, fill the inside with stuffing proportioned after the rule on page 197. Sew and bake, or steam it, in milk enough to baste it. Cut off a square piece from the thicker end remaining, and strip off the skin; remove the flesh from the bone, and keep it as whole as possible, and prepare it according to the directions for fried fish, dipping it in batter instead of in egg. Save all the remainder of the fish, scrape the small bits from the bones, and use these with the bones for a chowder. A small portion of fish may be steamed for fifteen minutes, between two buttered plates.

Any pieces of cooked fish may be freed from bones and skin, moistened with white or tomato sauce, covered with buttered crumbs and baked. See directions for scalloped meat, pages 73, 77.

RECEIPTS FOR COOKING FISH.

Broiled Fish.

To broil mackerel, white fish, small blue-fish, trout, small cod, shad, or any other thin fish, split them down the back, and remove the head and tail. Sometimes it is well to remove the backbone also.

To broil halibut, salmon, and other thick fish, cut them into inch-slices across the backbone, and remove the skin and bone. Cut flounder, bass, and chicken halibut into fillets, or the natural divisions each side of the bone. Oily fish need only salt and pepper, but dry, white fish should be spread with soft butter before broiling.

Grease a double wire broiler with salt pork rind. Put the thickest edge of the fish next the middle of the broiler; broil the flesh side first until it is brown, lifting it up often that it may not burn. Cook the other side just enough to crisp the skin. The time will vary with the thickness of the fish.

The flesh, when done, should look white and firm, and should separate easily from the bone. Loosen the fish from each side of the broiler, open the broiler and slide off the fish, or hold a platter over the skin side of the fish, and invert platter and broiler together. Season with butter, salt, and pepper, and lemon juice, if liked.

Some acid condiment is usually agreeable with fish.

Baked Fish.

Cod, haddock, blue-fish, small salmon, bass, and shad, may be stuffed and baked whole.

Clean, wipe, and dry the fish, rub with salt, fill with stuffing, and sew the edges together. Cut gashes two inches apart on each side. Put narrow strips of fat salt pork in the gashes, and in the pan under the fish. Place the fish upright in the pan by propping it up with potatoes, or by skewering the head one way and the tail the other. Dredge the fish with flour. Put it into a hot oven without water; when the flour is brown, baste with the pork fat, and baste often. It is done when the flesh separates easily from the bone. Remove it carefully to a hot platter, draw out the strings or skewers, and serve with drawn butter or egg sauce.

Thick pieces of halibut or cod may be stuffed, or not, and baked in the same way. Fish may also be baked in milk enough to cover the bottom of the pan. When cooked in this way no pork or flour is needed. The milk keeps the fish moist, and makes it brown better. It is a good substitute for pork, and is especially nice for any dry, white fish.

Boiled Fish.

To boil nicely, without breaking, fish should be of uniform thickness. A small salmon, or the middle cut of a large one, or the thickest part of cod or blue-fish, or a thick piece of halibut, should be selected for boiling.

The most economical way is to cook the fish in a steamer over boiling water. If that is not convenient, put the fish in a wire basket, or on a plate, and the plate in a square of cloth; when done lift cloth, plate, and fish together. Put the fish into boiling salted water, and let it simmer (not boil) till done. The time will

vary with the shape of the fish. See time-table for boiling, page 39. Boiled fish should be well drained and be served with a rich sauce.

Fried Fish.

Smelts, perch, trout, and other small pan fish may be fried whole. Cod, halibut, and other thick fish should be skinned and boned and cut into slices one inch thick and two or three inches square. Fish for frying should be thoroughly cleaned, dried, and seasoned with salt, then covered with flour, or fine meal, or fine bread crumbs, then dipped in beaten egg, then in crumbs again. Or they may be dipped in flour paste instead of egg, before dipping in the crumbs. Fry in deep, smoking hot fat, or in a small amount of hot salt pork fat, from two to five minutes. Drain on paper, and serve with tomato sauce. The fat for frying fish should be hot enough to brown a bit of bread while you count 40.

Stuffing for Baked Fish.

Weighing from four to six pounds.

1 c. cracker crumbs.
1 ssp. salt.
1 ssp. pepper.
1 tsp. chopped onion.
1 tsp. chopped parsley.
1 tsp. capers.
1 tsp. pickles.
¼ c. melted butter.

This makes a dry, crumbly stuffing. If a moist stuffing be desired, moisten the crackers with cold water, or use stale (not dried) bread crumbs, and moisten with one beaten egg and the butter.

It is not necessary to have all the seasoning given in the receipt, but some acid, like pickles, lemon, or vinegar, is more agreeable than sweet herbs, in a stuffing for fish.

Drawn-Butter Sauce.

1 pt. hot water or milk.
½ c. butter, scant.
2 tbsp. flour.
½ tsp. salt.
½ ssp. pepper.

Put half the butter in a saucepan; be careful not to let it become brown; when melted add the dry flour, and mix well. Add the hot water, a little at a time, and stir rapidly as it thickens. When perfectly smooth add the remainder of the butter, one small piece at a time, and stir till it is absorbed. Add the salt and pepper. When carefully made, this sauce should be free from lumps; but if not smooth, strain it before serving.

For sauce for boiled fish use the water in which the fish was boiled.

Egg Sauce. Add to the drawn butter two or three hard boiled eggs, either chopped or sliced.

Fish Chowder.

1 lb. cod or haddock.
1 inch cube salt pork.
½ onion.
2 potatoes.
spk. pepper.
1 tbsp. flour.
1 tbsp. butter.
1 c. milk.
2 crackers.
1 tsp. salt.

Cook the fish bones and head half an hour, then strain the water. **Cut** the salt pork and onion into dice, and fry till light brown. Slice the potatoes, scald them 5 m., pour off the water, add the strained pork fat, and the bone water. When boiling add the fish, simmer 10 m., or until the potatoes are tender. **Add** the seasoning, and the butter, flour, and milk cooked together as for white sauce; serve with crackers.

Salt Fish Balls.

1 c. potatoes.	½ egg.
½ c. salt fish.	spk. pepper.
1 tsp. butter.	Fat for frying.

Wash the fish and shred it into half-inch pieces. Pare the potatoes, and if large cut into quarters. Put the potatoes and fish in a stew-pan and cover with boiling water. Cook 25 m., or until potatoes are soft. Drain very dry, mash fine, add butter, seasoning, and beaten egg. Beat well, shape on a spoon, drop into smoking hot fat, fry till brown and drain on paper.

The same mixture may be cooked as hash.

Questions on Lesson XVIII.

1. Why is fish a valuable food?
2. How does fish compare with meat?
3. How do the white varieties of fish differ from the dark or red-blooded fish?
4. Which are better for invalids?
5. What is the test for the freshness of fish?
6. How may salt cod be used?
7. What kinds of fish may be baked?
8. Which are best broiled; fried; boiled?
9. How do you prepare fish for frying?
10. Why is it necessary to have the fat smoking hot?
11. How do you make a fish chowder?

LESSON XIX.

EGGS.

Some people consider it extravagant to use many eggs in cooking. It is extravagant to use them unnecessarily, that is, to use four in a place where one would answer the same purpose, as in muffins or corn cake, or to use them in the ways in which we get the least good from them, as in rich, heavy cake, or to use them freely in the season when they cost the most. But in the spring, when the price is low, they may be used in any of the simple ways of boiling, poaching, etc., or in plain cake and custards and other wholesome combinations. Eggs are nutritious and contain all the elements we need in food; but as they are too highly concentrated we must supply what they lack by using bread, rice, butter, or milk with them.

The shells of newly-laid eggs are almost full, but as the shells are porous, on exposure to the air the water inside evaporates, and the eggs grow lighter, while air entering in fills the place of the water, and causes the elements in the egg to change, and the eggs soon spoil. This explains why a good fresh egg is heavy and will sink in water, and why a stale egg is lighter, has a rattling or gurgling sound, and floats in the water.

Eggs should be kept in a cool dark place and handled carefully, as any jarring motion may rupture the mem-

brane which separates the white from the yolk, and if they become mixed, the egg spoils quickly. Anything which will entirely exclude the air from the eggs will help to keep them.

OYSTERS.

Oysters are used more extensively and are more highly prized than any other shell-fish. They are easily digested when fresh and only slightly cooked, but when over-cooked they are tough and leathery.

They contain so little nutriment, however, in proportion to their cost, that they are a very expensive food, and are more suitable for a convalescent, or to give variety, than to furnish vigor for either brain or muscular effort.

LOBSTERS.

The city markets are now so well supplied with these delicious shell-fish that they may be obtained in good condition all the year, but they are usually cheaper in the spring. Lobsters are put alive into boiling salted water, and cooked twenty minutes from the time the water boils. The shells are dark green when alive, but turn bright red when put into boiling water.

Lobsters should not be eaten until cold, and should never be kept more than eighteen hours after boiling. They have been considered difficult of digestion, probably on account of their being eaten when not fresh, or with an excess of condiments, or in unwholesome combinations; for it has been proved repeatedly that persons whose digestive organs are weak can eat plain lobster without any unpleasant effect.

CAKE MAKING AND BAKING.

It is not our purpose to give much time or attention to cake making in these lessons. There is little danger of this branch of cooking being neglected; and gratifying as it would be to school-girls generally, to make cake in every lesson, there are so many more important things to learn, that this subject must be kept in the background. It is well for girls to emulate their mother's and grandmother's skill in cooking, but not in the art of making "eleven kinds of cake for a party."

There are really only two kinds of cake, those with butter and those without. If you understand the proper methods of mixing and how to regulate the baking, you will be successful with any reliable receipt.

You have become familiar with the general rules for batters and doughs; and the principles underlying these apply in cake making, only in the latter a greater amount of butter and sugar is used, and there is some variation in the manner of mixing.

Butter cakes, or those made with butter, include all the varieties of cup cake, pound cake, fruit cake, etc. There are two ways of mixing. First, soften the butter and rub it to a cream, add the sugar and beat both until creamy; beat the yolks till light-colored and thick, then beat them into the sugar and butter. Mix the soda, cream of tartar, and spice with the flour; then add milk and flour alternately, beating well, and lastly add the whites beaten stiff. All butter cakes should be beaten just before being poured into the pan until smooth and fine-grained. If fruit is used, flour it well to keep it from sticking, and add it last.

The second and easier way of mixing plain cake is similar to that of mixing breakfast cakes. Put the flour in the mixing bowl, and sift and mix with it the soda, cream of tartar, and spice. Add the sugar and mix thoroughly. Beat the yolks, add the milk, and stir this into the flour mixture. Then stir in the butter melted, and the stiffly beaten whites last, and beat all together vigorously, just before putting it into the pans.

Sponge Cakes. These are made without butter, and when quite rich contain only eggs, sugar, flavoring, and flour. A cheaper kind is made by using some liquid, usually water, and more flour, and substituting soda and cream of tartar for part of the eggs. In mixing, beat the yolks of the eggs until light and thick, add the sugar, flavoring, and water, then the flour mixed with the soda and cream of tartar, and lastly the beaten whites of the eggs. When only eggs, sugar, and flour are used, there must be vigorous beating of the yolks and sugar, and no beating at all after the whites and flour are added, — only a mixing of the ingredients.

Baking Cake. Do not attempt to make cake unless you can have entire control of the fire. It should be rather low, but sufficient to heat the oven moderately, and to last without replenishing through the entire baking. Thin cakes require a hotter oven than those baked in thick loaves. Cakes made with baking-powders or soda and cream of tartar should bake more quickly than pound cake or sponge cake made light with eggs alone. Cakes with molasses in them require a quick oven, but as they burn quickly they must be baked with care; whichever kind you are baking, ascertain from the time-table on page 155 the time required and divide it into quarters. Look at it quickly, within five minutes

During the first quarter of the time the cake should merely rise and not brown.

If it brown before rising, the oven is too hot and must be cooled. It should continue to rise on the edges during the second quarter and begin to brown in spots. In the third quarter it should rise in the centre and become all over a rich golden brown, and perhaps crack a little in the middle. In the last quarter it should settle to a level, brown in the crack and shrink from the pan.

During the first and second quarter the cake may be moved carefully if necessary, but in the third quarter, or when it is fully risen but not stiffened by the heat, there is danger of its falling, and it is better to protect it by a paper hood[1] than to move it. Slamming the oven door will often cause the cake to fall.

Cake is done when it shrinks from the pan and stops hissing, or when a straw inserted in the centre comes out clean.

Loosen the edges of the cake with a knife and turn the pan over carefully upon a cloth laid over a bread cooler or sieve.

Suggestion to the Teacher.

In this lesson, use oysters in the fall and lobster in the spring. One or two receipts will be sufficient for illustration. Make the smallest possible quantity of cake. The receipt for plain cake may be halved. Poach one egg to show how it is done, then cook the same egg longer until hard and use it in making the egg vermicelli.

[1] Crease a piece of stiff paper on each end so that the edges will rest on the oven bottom, and the top of the paper will be at least an inch above the cake.

RECEIPTS FOR LESSON XIX.

Plain Cake.

¼ c. butter.
1 c. sugar.
2 eggs.
½ c. milk.
1 tsp. baking-powder.
1½ c. flour.
1 ssp. spice, or
½ tsp. flavoring.

See that the fire and oven are right, and have all the ingredients at hand. Line the pans with buttered paper. Mix the baking-powder and spice with the flour. Separate the eggs. Measure the butter, rub it till creamy, add the sugar, and in scraping out the sugar take all the butter that has adhered to the cup. Beat well, add the well-beaten yolks and the flavoring. Rinse out the yolk with the milk, then add milk and flour alternately, and the whites, beaten to a stiff froth, last. Beat well, bake in a shallow pan about 20 m., or until it shrinks from the pan.

Vary the cake by adding ½ c. currants, or nuts chopped fine, or by coloring a part with dark spices or chocolate.

Water Sponge Cake.

1 egg.
½ c. sugar.
½ tsp. lemon juice.
3 tbsp. cold water.
⅔ c. flour.
1 even tsp. baking-powder.

Beat the yolk of the egg, add the sugar and beat again, add the lemon juice and water, then the flour in which the baking-powder has been mixed, and lastly the whites beaten stiff. Bake in a small shallow pan, or in scalloped tins.

Frosting.

1 c. powdered sugar.	1 tbsp. lemon juice
1 tbsp. boiling water.	(not extract).

Add a few drops more of boiling water until it is thin enough to settle when you stop stirring.

A little melted chocolate may be used to give variety.

Dropped or Poached Eggs on Toast.

Toast a slice of bread for each egg and trim neatly. Have a clean shallow pan nearly full of salted boiling water. Remove all the scum and let the water simmer. Break each egg carefully into a saucer, and slip it gently into the simmering water. Dip the water over them with a spoon, and when a film has formed over the yolk and the white is firm, take each egg up with a skimmer, drain, trim off any rough edges, and place it on the toast. Sprinkle salt and pepper on each egg.

Omelet.

2 eggs.	1 ssp. salt.
2 tbsp. milk.	1 ssp. pepper.

Beat the yolks of the eggs till light-colored and creamy, add the milk, salt, and pepper. Beat the whites till they are stiff and dry. Cut and fold them lightly into the yolks till just covered. Have a clean smooth omelet pan or small spider. When hot, rub it round the edge with 1 tsp. of butter on a broad knife; let the butter run all over the pan, and when bubbling turn in the omelet quickly and spread it evenly on the pan. Lift the pan from the hottest part of the fire and cook

carefully, until slightly browned underneath. Put it on the oven grate to dry but not to brown on the top. When dry in the centre run a knife round the edge, then under the half nearest the handle and fold over toward the right. Hold the edge of a hot platter against the lower edge of the pan, and invert the omelet upon the platter.

Egg Vermicelli.

Separate the yolk from the white of hard-boiled eggs. Chop the white fine, and mix it with a little hot milk or thin white sauce. Season with salt and pepper, pour it on toast, and rub the yolk through a strainer over the top.

To Prepare Oysters for Cooking.

Pour ½ c. cold water over 1 qt. of oysters; then with clean hands take out the oysters separately, and remove any bits of shell or sea-weed. Serious accidents have often resulted from the presence of pieces of shell. The oyster liquor is seldom used, as enough comes from the oysters in cooking, but if desired it should be strained before using.

To Parboil Oysters in their Liquor.

Put them in a saucepan without water; stir them, or shake the pan slightly; as soon as heated, sufficient liquor comes from them to keep them from burning. When the edges curl and the oysters look plump instead of flat, they are cooked. It takes but a few minutes, and care must be taken not to over-cook them.

When seasoned with salt, pepper, and butter it is called a *plain roast;* if put on toast, a *fancy roast.*

Fried Oysters.

Season large prepared oysters with salt and pepper. Roll them in fine cracker crumbs. Melt a little butter in a frying-pan. Brown the oysters on each side and serve very hot. Or cover with fine bread crumbs, egg, and crumbs, and fry in deep, smoking hot fat.

Stewed Oysters.

1 c. milk scalded.	½ ssp. pepper.
1 pt. oysters.	½ tbsp. butter.

When the milk is scalding hot, put the prepared oysters in another saucepan and heat them until the edges curl; add the pepper, butter, and salt, if needed, and the hot milk. Serve at once.

Scalloped Oysters.

1 pt. oysters.	½ tsp. salt.
1 c. cracker crumbs.	½ ssp. pepper.
⅓ c. melted butter.	

Prepare the oysters and season them with the salt and pepper. Stir the crumbs in the butter with a fork. Butter a shallow dish, put in ¼ of the crumbs, then ½ of the oysters, another ¼ of the crumbs, the remaining oysters, and a thick layer of crumbs on the top. Bake 20 m., or until the crumbs are brown and the juice bubbles up on the edges.

In doubling the rule do not double the crackers, for

it takes no more for the lower and upper layers, only for the middle layer. Half as many more will be sufficient.

To Select and Open Lobsters.

Choose one that is heavy, of medium size, with a hard shell streaked with black.

Wipe it, break off the claws, separate the tail from the body, and the under part of the body from the shell. Remove the meat from the tail, claws, and the body, save the green liver and the coral, but be careful to discard the vein in the tail, and also the gills, stomach, and head.

Plain Lobster.

Cut the meat into small pieces and mix the liver with it; dry the coral and rub it through a strainer over the meat. Serve with vinegar, melted butter, or with cold slaw dressing; or mash the liver to a smooth paste, season it with salt and pepper. Thin it with oil or melted butter and vinegar and pour it over the lobster.

Stewed Lobster.

Cut the lobster fine. Allow ½ c. milk to 1 pt. lobster. Heat the milk, add the lobster, 1 tbsp. butter, and a little pepper. Boil up once and serve plain or on crisped crackers.

Cook the lobster just long enough to heat it, as longer cooking renders it tough.

Questions on Lesson XIX.

1. When is it extravagant to use eggs?
2. What should be eaten with eggs?
3. Why is a fresh egg heavier than a stale egg?
4. Does it injure eggs to handle them roughly even if the shell is not broken?
5. What is the value of oysters as food?
6. How may they be cooked?
7. How are lobsters prepared for the table?
8. What are the two principal varieties of cake?
9. How are butter cakes mixed?
10. How are sponge cakes mixed?
11. What is the general rule for all cake baking?

LESSON XX.

LAYING THE TABLE.

THESE directions are not intended merely for occasional dinners. They are for every-day home life; and though every detail may not be adapted to all families, yet any housekeeper, no matter how limited her means, who has a table, a cloth to cover it, and dishes for food, may follow the principal suggestions. Habits of order and neatness may be cultivated at a pine table, with twenty-five cent table-linen, and the cheapest crockery. Meals may be served in a proper way, even if one cannot follow every change which fashion may suggest.

Place the centre of the cloth in the centre of the table, and have the middle fold outside, and straight with the edge of the table. A spotless cloth, smooth and straight, is essential to the enjoyment of a meal. Lay a plate, right side up, for each person, one plate at each end, and those at the sides opposite each other. At breakfast and dinner, or when hot plates are needed, place them all in a pile, in front of the one who is to serve. Lay the knife with the sharp edge toward the plate, the tumbler with the top up, and the butter-plate at the right of each plate; the fork with tines up and the napkin, at the left; the spoons with the handles toward the right, in front of the plate. Place a small dish at the left corner, to be used for potato skins, bones, egg shells, hot rolls, etc., to prevent soiling the cloth.

Fruit or flowers, if used, should occupy the centre of the table. The salt and pepper, vinegar and oil, pickles or jelly, butter, etc., place at the corners. Lay a soup-ladle in front of the hostess, the handle toward the right; the carving knife, steel, and fork, on the carving-rests in front of the host; the butter-knife beside the butter, and two large tablespoons crosswise, at opposite corners. Have spoons, or knives and forks, suitable and sufficient in number for each dish to be served.

Arrange the various dishes on the table in regular order, straight with the table, and exactly in front of those who are to serve them; or if at an angle, let there be some uniformity. The cups, plates, and dishes for hot food should be heated.

At breakfast or supper, arrange in a semicircle in front of the hostess the tea or coffee, tray-bowl, spoon-glass, sugar-bowl, cream-pitcher, and hot water, with the cups and saucers inside the circle.

Finger-bowls are by some people considered a luxury, and are not usually placed on the table until the dessert; but there are other occasions when they are equally necessary, and there is no reason why they should not be used. They may be put on at the left of the plate, at the beginning of the meal. When fruit is used as a first course at breakfast, and when sweet corn is served on the cob, finger-bowls are almost indispensable.

Arrange the chairs so far away that they will not have to be drawn out when the family are being seated.

In announcing the meal, do not ring the bell when there are invited guests, but tell the hostess that dinner, or whatever the meal may be, is served. In simple

family life a bell is allowable, but it would be better to have a regular hour for each meal, and then for each member to come promptly at the hour.

WAITING ON THE TABLE.

The want of a maid to wait on the table is no excuse for the sort of every-one-for-himself style of serving which is too often seen. Children, boys as well as girls, should be taught and allowed to help in the serving, even if one have a waitress. If they can have a daily share in the duties, filling the glasses, passing butter or sauce, removing the dishes between the courses, etc., nothing will give them more ease and self-possession when unexpectedly called to fill the place of mother or father at the table, or better help to counteract the evil habits of hurried eating and indifference to the wants of others, or better enable them to direct if they should ever have homes and domestics of their own. The following general directions may be adapted to any style of living.

If the serving be done wholly by the family, special pains should be taken, in laying the table, to provide everything necessary, that there may be no occasion to leave the table. Spoons for tea or sauce may be laid at the plates, butter-plates and glasses filled, and other things made ready before the family are seated.

At breakfast, nearly every one wants coffee or other drink first, and there should be no undue haste in passing the substantials until these have been served. Ascertain the preference of each one as to sugar and cream, and put them in the cups, instead of passing them separately.

Do not fill the plates indiscriminately, and send them to go the round of the table, but consult individual tastes or needs, and give each one the opportunity of choice as to the various dishes. Serve first those whom you wish most to honor.

It makes less confusion for some one to sit near the one who carves, and to help to the vegetables and various dishes that are to be served on the same plate with the meat, instead of passing them back and forth. Be careful to pass all the accompaniments with the principal dishes,—the butter and syrup with hot cakes, the cream and sugar with mush and fruit, the condiments and relishes where they are needed, etc., and avoid having many things passing round at the same time.

There are many families where the lady of the house is the only person who can leave the table to arrange for the change of courses, but if there be other and younger members of the family capable of such service, it should be performed by them. No girl, old enough to carry a dish without breaking it, should ever permit her mother to leave the table for any such purpose. A side table on castors may be placed within easy reach, and will save much confusion in family serving.

Whether the waitress be one trained to the work, or one of the children, the same rules will apply. The waitress should remove the cover from the tureen or any other dish, turning it over deftly so it will not drip on the cloth, and lay it on the side table. Stand at the left of the one who is serving, and take on the tray each plate in turn to the one for whom it is intended.

In passing a plate of soup or meat, set it on the table in front of the person; the cup of coffee or any other

drink place at the right hand, and thus avoid reaching across the plate, and also relieve the one at the table from the awkwardness of taking the dish from the tray. But in passing vegetables or any dishes from which a person is to take a portion, pass them on the tray at the left, that it may be taken with the right hand. The tray should be held firmly, and low and near enough that the dish may be within easy reach. Put the dishes back on the table in their places, and keep everything on the table in good order.

In passing a plate hold it so the thumb will not rest on the upper surface. In filling glasses, take the glass near the bottom, never with the hand over the top, draw it to the edge of the table, but do not remove it, and fill only three-quarters full. When a change of plates is required, remove the plate on the table with the left hand, before attempting to put the other plate in its place.

At a dinner of many courses, as soon as a guest has finished the course remove his plate; but at the family dinner do not remove any plates until all are through. When one course is finished, take the tray in one hand, and with the other remove from the left all the spoons, or knives and forks; this will prevent the danger of dropping them if taken away on the plates, and make less confusion in washing. Take away the plates, never more than one in each hand; and also everything not needed for the next course. Before the dessert, remove the crumbs with a broad knife or scraper into a plate.

After a meal, first set the chairs in their places, and always brush up the crumbs that may have fallen, lest they be trodden into the carpet. In clearing a breakfast or tea table, where there has been no change of

courses, remove the glasses and silver first. Put any food that may be used again on small dishes, never on the table dishes. Scrape the dishes, empty and rinse the cups, and neatly pack together those of a kind, near where they are to be washed. Brush the crumbs from the cloth, fold it in the creases, and put it away carefully.

TABLE MANNERS.

There is no place where it is more essential, or where there is a better opportunity to observe the golden rule, than at the daily home table.

"If you please," and "No, I thank you," are in far better taste than "Yes, thanks," and "No, thanks." Accept what is offered or placed before you; but should your preference be asked, and you have any, it is allowable to name it at once. When a plate has been filled for you, keep it, and do not from mistaken courtesy pass it to the next person. Make some sign of acknowledgment for what is served you, either by an inclination of the head or a quiet "thank you," whether it be offered by those presiding at the table or by the waitress. Courtesy to all, and especially to a child or a servant, should be the daily habit.

In family serving, wait until all are helped before you begin to eat, and be on the alert to assist in the serving as much as possible. But where there are trained waiters and several courses, begin as soon as you are helped that there may be no delay.

Keep the spoon in the saucer, because if left in the cup, both are liable to be overturned.

Do not talk or drink while food is in the mouth.

Take your soup quietly, from the side of the spoon,

lest in bending your arm to put the end of the spoon in your mouth you interfere with your next neighbor. Dip it into the plate *from* instead of toward you, and thus avoid dripping the soup.

Break the bread or roll, and eat it separately, not in the soup, because it is awkward to take the bread from the side of the spoon. Never lay the bread on the table while spreading it with butter, nor bite from a large piece. Break off a small portion, and spread with butter as needed.

Use the knife only as a divider; use the fork to convey the food to the mouth. Do not pile food on the back of the fork, but pick it up with the fork, or when necessary hold the fork inside up and use it as you would a spoon. Keep a bit of bread in the left hand to assist in the use of the fork.

In passing your plate for a second portion remove the knife and fork, letting them rest on the edge of the butter-plate, or on a bit of bread, but do not hold them in your hand. When not using the knife as a divider, keep it on the butter-plate, and then if you have occasion to pass your plate the knife is already out of the way.

During the meal keep everything about your plate as neat as possible, and after passing anything put it back in its place.

When your meal or one course is finished, place the knife and fork in the centre of the plate, the tines down and handles directly in front, that they may not be in the way in removing the plate. This signifies to a trained waitress that you are ready to have your plate removed.

At the close of the meal fold your napkin, that the table may be left in an orderly condition.

Whether serving, waiting, or eating, do everything quietly, easily, and neatly. Never be so absorbed in your own enjoyment of a meal as to be unmindful of the needs of others.

If you are in doubt as to what to do, imitate as far as possible those whose habits show that their opportunities for cultivating good manners have been superior to yours; but on the other hand, when with those whose privileges are less than yours, make no pretentious or unnecessary display, and never cause any one discomfort by noticing any habit that may not be in accordance with your notions. Should you be at a table where butter-knives are not provided, it would be more courteous quietly to use your own knife than to call attention to the omission. If an elderly guest prefers to drink her tea from the saucer, make her feel more at ease by taking yours in the same way. Should a friend prefer sugar and vinegar, rather than French dressing on lettuce, or prefer to eat celery with the other dishes instead of by itself, allow her to do so and never call attention to any personal preferences.

It is not a breach of good manners if you happen to eat your oysters with the common fork because you are unfamiliar with the one provided for that purpose, or choose a small spoon instead of a large one for your soup, or prefer to soak your bread or toast in your soup or coffee; but it is unpardonable to annoy others by noisily eating, or drinking, or smacking the lips, or by picking the teeth at the table or doing anything that would interfere with another person's liberty or enjoyment. And it is equally unpardonable and even more impolite to be annoyed by anything in others whom you are not at liberty to correct and whose intentions are

kind even if some of their habits may be awkward. No matter how you may feel or what the blunder or accident may be, never show any displeasure to either servant or guest. "Be mistress of yourself though china fall."

Many more hints might be given but the following general suggestion will apply to every occasion.

In table etiquette any custom is commendable that is based on the golden rule, or is sanctioned by those whose general behavior — not table manners, merely — shows that good-breeding with them means, *not selfishness*, but thoughtfulness for others. But all notions whose root is in a desire to imitate persons whose style of living is pretentious, and whose tastes and habits are capricious are worse than useless. They destroy alike our happiness and our self-respect.

Suggestion to the Teacher.

All schools should have dishes sufficient to set a table, for it is highly desirable that the pupils occasionally prepare a complete meal and be trained in the proper serving of it. But if the table conveniences be limited, much may be taught by using the common cooking dishes, and if there be not time to prepare a dinner, a form or ceremony may be gone through with, which will impress upon the minds of the pupils all the important points in laying the table, waiting upon people, and in personal habits at the table. This instruction need not be left until the last lesson, but may be given in portions whenever there is opportunity.

RECEIPTS FOR LESSON XX.

Chocolate and Cocoa.

1 c. milk scalded.	1 oz. or square chocolate.
1 c. hot water.	1 tbsp. sugar.

Cut the chocolate in small pieces and put it with the sugar and 2 tbsp. of the water into a saucepan. Stir over the fire until smooth and glossy. Add the remainder of the water gradually, and then the milk. Serve at once. Use twice as much chocolate if a richer drink be desired. For cocoa use 1 tbsp.

Coffee.

1 hp. tbsp. coffee to 1 c. boiling water.

Reduce the proportion of coffee, taking level tbsp. when several cups are required. Mix the coffee with 1 clean egg shell or 1 inch of fish skin. Put it in the pot, add the boiling water, and boil only 5 m. Set it where it will keep hot but not boil. Add ½ c. of cold water. Pour out a little and pour it back, to clean the grounds from the spout.

Questions on Lesson XX.

This is to be a general examination. Each teacher should therefore be left to prepare her own questions, being expected so to frame them as to bring out in the answer the various and complete knowledge of the pupils.

TABLE OF AVERAGE COST OF MATERIAL USED IN COOKING.

1 cup of flour or meal	$0.01	1 pound of spaghetti	$0.16
1 " sugar	.06	1 " cornstarch	.10
1 " butter	.20	1 can of tomatoes	.15
1 egg	.03	1 " salmon	.18
1 cup of molasses	.05	1 " lobster	.15
1 " milk	.02	1 " devilled ham and tongue	.30
1 tablespoonful of wine	.02	1 tumbler of jelly	.35
1 " " brandy	.04	1 jar of marmalade	.25
1 teaspoonful of vanilla	.02	1 pound of tea	.75
1 " " spice	.02	1 " coffee	.38
1 " " soda, and 2 teaspoonfuls of cream of tartar	.02	1 " chocolate	.40
1 tablespoonful of butter	.03	¼ " nutmeg	.32
Butter size of an egg	.05	¼ " mace	.60
1 tablespoonful of olive oil	.02	¼ " cloves, cassia	.15
2 tablespoonfuls of coffee	.05	¼ " ginger	.10
2 teaspoonfuls of tea	.01	¼ " mustard	.12
1 quart of milkman's cream	.25	¼ " herbs, ground	.10
1 " Deerfoot cream	.60	Package of whole herbs	.08
1 box of gelatine	.16	1 pound of cheese	.18
1 lemon	.02	1 " Parmesan cheese	.50
1 orange	.03	1 peck of potatoes	.25
1 pound of raisins	.18	" apples	.50
1 " currants	.10	1 quart of onions	.10
1 " citron	.18	1 carrot	.02
1 " crackers	.10	1 turnip	.05
1 " tapioca	.07	1 bunch of celery	.20
1 " rice	.09	1 handful of parsley	.05
1 " macaroni	.18	1 bunch of watercresses	.05
		1 head of lettuce	.10

These prices are for the best materials, and are estimated for the season, from October to June, when butter and eggs are higher than during the summer.

TABLE OF COST OF MEAT AND GAME.

Shin of beef,	3 to 6	cts.	per lb.
Middle cut of shin,	7 to 10	"	"
Lower part of round,	13 to 15	"	"
Vein,	20 to 25	"	"
Top of round,	20 to 25	"	"
Aitch bone,	8 to 10	"	"
Face of rump,	17 to 22	"	"
Middle "	25 to 28	"	"
Back "	22 to 30	"	"
Sirloin,	28 to 33	"	"
Whole tenderloin,	75 c. to $1.00		"
Small "	30 to 45	cts.	"
Tip of sirloin,	22 to 30	"	"
First cut of rib,	17 to 25	"	"
Second cut of rib,	15 to 20	"	"
Chuck rib,	7 to 14	"	"
Second cut rib, corned,	12 to 15	"	"
Brisket,	8 to 12	"	"
Boneless brisket,	15	"	"
Flank,	6 to 11	"	"
Liver,	10 to 12	"	"
Tripe, plain,	6 to 18	"	"
Tripe, honey-comb,	15	"	"
Heart,	3 to 10	"	"
Suet,	7 to 12	"	"
Mutton, leg,	12 to 20	"	"
Mutton, loin,	14 to 20	"	"
Mutton, saddle,	15 to 20	"	"
Mutton, chops,	15 to 25	"	"
Mutton, fore quarter,	8 to 12	"	"
Mutton, neck,	6 to 9	"	"
Lamb, leg,	14 to 30	cts.	per lb.
Lamb, chops,	15 to 40	"	"
Lamb, fore quarter,	10 to 25	"	"
Veal, knuckle,	12 to 17	"	"
Veal, cutlet,	22 to 28	"	"
Veal, breast,	9 to 14	"	"
Sweetbreads,	25 to 70	"	whole.
Calf's liver,	25 to 70	"	"
Calf's heart,	5 to 8	"	each.
Calf's head,	25 to 60	"	"
Fresh pork,	9 to 15	"	per lb.
Salt pork,	11 to 15	"	"
Bacon, bag,	17 to 20	"	"
Bacon, sliced,	15 to 18	"	"
Ham, bag,	17 to 20	"	"
Ham, sliced,	20 to 25	"	"
Lard,	11 to 15	"	"
Leaf lard,	10 to 15	"	"
Sausage,	12 to 20	"	"
Turkeys,	20 to 35	"	"
Fowl,	12 to 30	"	"
Chickens,	18 to 75	"	"
Ducks, wild,	25 c. to $1.50		each.
Ducks, tame,	20 to 37	cts.	per lb.
Ducks, Canvas-back,	$1.50 to $2.00		each.
Grouse,	75 c. to $1.25		"
Partridge,	75 c. to $1.25		"
Pigeon, wild,	75 c. to $2.00		per d.
Pigeon, tame,	12½ to 25	cts.	each.
Squab,	$2.50 to $4.50		per d.
Quail,	$1.50 to $3.00		"

TABLE OF THE COST, ETC., OF FISH.

[Where no time is specified the fish are always in season.]

	Cost.	Weight.	How Sold.	When in Season.
Cod.	8 cts. per lb.	3 to 20 lbs.	Whole.	
Haddock.	6 to 8 cts. per lb.	5 to 8 lbs.	Whole.	
Cusk.	8 cts. per lb.	5 to 8 lbs.	Whole.	Winter.
Halibut.	12 to 20 cts. per lb.	. . . . .	By the lb.	
Flounders.	6 to 10 cts. per lb.	½ to 5 lbs.	Whole.	
Salmon.	25 to 50 cts. per lb.	. . . . .	By the lb.	May to Sept.
Shad.	$1.25 in March 25 cts. in May.		Whole.	Spring.
Blue-fish.	7 to 15 cts. per lb.	4 to 10 lbs	Whole.	June to Oct.
Tautog.	12 cts. per lb.	. . . . .	Whole.	July to Sept.
White-fish.	20 cts. per lb.	4 lbs.	Whole.	Winter.
Bass.	12 to 25 cts. per lb.	3 to 8 lbs.	Whole.	
Sword-fish.	15 cts. per. lb.	. . . . .	By the lb.	July to Sept.
Smelts.	10 to 25 cts. per lb.	{ Average 8 to a lb.	. . . .	Sept. to Mar.
Perch.	20 cts. per dozen.	. . . . .	. . . .	Summer.
Pickerel.	15 cts. per lb.	1 to 4 lbs.	Whole.	
Trout, Brook.	75 cts. per lb.	. . . . .	Whole.	Spring.
Mackerel.	5 to 25 cts. each.	. . . . .	Whole.	April to Oct.
Eels.	15 cts. per lb.	½ to 1 lb.	Whole.	
Lobsters.	12 cts. per lb.	1 to 2 lbs.		
Oysters.	35 to 50 cts. per qt.	. . . . .	. . . .	Sept. to May.
Clams.	20 cts. per qt.; 40 cts. per pk. in the shell.			
Crabs.	$1.25 to $1.50 per dozen.	. . . .	. . . .	Summer.
Herring.	20 cts. per dozen.	. . . . .	. . . .	Mar. & Apr.
Salt Cod-fish.	10 cts. per lb., best.			
Smoked Fish.	20 to 35 cts. per lb.			

ADDITIONAL RECEIPTS.

As a lesson in some dishes which are in common use would require too long a time, or would be too expensive to attempt at the school, the following receipts are given for those pupils who wish to try them at home: —

Baked Beans.

1 qt. pea beans.
¼ lb. salt pork, fat and lean.
1 tsp. salt.
1 tsp. mustard.
⅛ c. molasses.

Soak the beans in cold water over night. In the morning put them into fresh cold water, and simmer till soft enough to pierce with a pin, being careful not to let them cook enough to break. If you like, cook one onion with them. When soft, turn them into a colander, and pour cold water through them. Place them with the onion in a bean-pot. Pour boiling water over the pork; scrape the rind till white; cut the rind in half-inch strips; bury the pork in the beans, leaving only the rind exposed. Mix the salt — use more if the pork is not very salt — and mustard with the molasses. Fill the cup with hot water, and when well mixed pour it over the beans; add enough more water to cover them. Keep them covered with water until the last hour, then lift the pork to the surface and let it crisp. Bake 8 h. in a moderate oven. Use more salt and ⅓ c. butter if you dislike pork, or use ½ lb. fat and lean corned beef. If liked richer use 1 lb. pork.

The mustard gives the beans a delicious flavor, and also renders them more wholesome. Many add a teaspoonful of soda to the water in which the beans are boiled, to destroy the acid in the skin of the beans. Yellow-eyed beans and Lima beans are also good when baked.

Corned Beef.

Select a piece of beef which has a fair proportion of fat — the brisket or second cut of rattle rand — and has not been in the brine more than three or four days. Wash quickly in cold water. Beef that is very salt should be soaked in cold water; but if only slightly salted, use boiling water that the goodness may be kept in the meat. Cover with boiling water and skim carefully when it begins to boil. Cook slowly, simmering (not boiling) until so tender that you can pick it to pieces with a fork. Let the water boil away toward the last, and let the beef stand in the water until partially cooled. Lift it out of the water with a skimmer, and pack it in a brick-loaf pan; let the long fibres run the length of the pan; mix in the fat so that it will be well marbled. Put a thin board, a trifle smaller than the inside of the pan, over the meat, and press by putting a heavy weight on the board. When cold, cut in thin slices. It has a very attractive appearance, and is a delicious way of preparing the meat. It is also the most appetizing way of serving the fat of the meat, which in corned beef is the most nutritious part, and is often untouched if offered in a mass on the edge of the lean.

Boiled Dinner.

4 lbs. corned beef.
2 beets.
1 small cabbage.
2 small carrots.
1 small French turnip.
6 potatoes.
1 small squash.

Wash the meat quickly in cold water, and if very salt, soak it ½ h. Put it in the kettle, cover with boiling water, and simmer about three hours, or till tender. Wash the vegetables, scrape the carrots, and cut the cabbage into quarters; pare the turnip and squash, cut into three-quarter inch slices, and pare the potatoes. Two hours before dinner-time skim off all the fat from the liquid, and add more boiling water. Remove the meat when tender, then put in the carrots, afterward the cabbage and turnip, and ½ h. before dinner add the squash and potatoes. Cook the beets separately. When tender take the vegetables up carefully, drain the water from the cabbage by pressing it in a colander, slice the carrots and beets, and cover the beets with vinegar. Put the meat in the centre of a large dish, and serve the carrots, turnips, and potatoes round the edge, with the squash, cabbage, and beets in separate dishes.

General Rule for Baked Meat.

All meat for baking or roasting should be dredged all over with salt and flour, but not until just before cooking. Salt draws out a little of the juice, but the flour absorbs it, and when the heat hardens the albumen, this helps to make a thick crust through which the juices cannot escape.

Use no water at first, nor at all with small pieces which require quick cooking or to be done rare; but after the first searing, large pieces that require to be cooked thoroughly may have a little water added to prevent them from burning or becoming too dry. Baste often, and bake according to the table on page 155.

Roast Chicken.

Clean and prepare the chicken as directed in Lesson XVII.

Stuffing. — Moisten 1 c. cracker or soft bread crumbs with ¼ c. melted butter, season highly with mixed sweet herbs.

Place the chicken on one side on a rack in a dripping-pan. Rub all over with salt, soft butter, or dripping and flour. Put 3 tbsp. of chicken fat or beef dripping over it and in the pan. Use no water at first. Put the pan in a very hot oven with the oven rack underneath to keep the fat from burning.

In 5 m. check the heat, baste with the fat, and when the flour is brown add a cup of hot water and baste often, adding more hot water as it boils away. Turn the chicken that it may brown uniformly, and baste often that it may not become dry.

Bake a 4-lb. chicken 1½ h., or until the joints separate easily. Pour off nearly all the fat, thicken the liquid in the pan with flour wet in cold water, cook 10 m., and strain the gravy before serving.

Indian-Meal Pudding.

Rub 1 tbsp. of butter around the bottom and sides of a smooth iron kettle, — granite or porcelain will

do; when melted, add ½ c. boiling water. This will prevent the milk from burning. Add 1 qt. milk. Let it boil up and almost over the kettle; then sift in 1 pt. of fine yellow granulated corn-meal, sifting with the left hand, and holding the meal high, that every grain may be thoroughly scalded. Stir constantly; add ½ tsp. salt, and set away till cold. Then add ½ pt. of New Orleans molasses and 1 qt. of cold milk. Put into a well-buttered deep pudding-dish, cover with a plate, and bake very slowly 10 or 12 h. Put it in a "Saturday-afternoon oven," where the fire will keep low nearly all night. Let it remain over night, and serve for a Sunday breakfast.

Berry Charlotte.

Stew 1 pt. of berries, — either blueberries, raspberries, or blackberries, — sweeten to taste, mash well, and pour it, boiling hot, over soft white bread. Have the bread cut in small, thin squares, arrange a layer in a bowl or mould, and pour on enough sirup to wet the bread, then another layer of bread and sirup. When cold, turn out and serve with cream. Berries that have large seeds may be strained after stewing.

Chocolate Creams.

Put the white of 1 egg in a small glass, then measure an equal quantity of cold water, add 1 tsp. of vanilla, and beat thoroughly. Beat in gradually enough confectioner's sugar, sifted, to make a stiff dough. Mould small pieces of the mixture into the shape of thimbles; put them on a buttered pan in a cool place to harden. Melt 2 squares of Baker's chocolate in a saucer over the

teakettle. When the cream balls are hard, dip them in the melted chocolate. Use two steel forks, let the balls drain on the forks, then put them on the tins again till dry.

Creamed Walnuts.

The white of 1 egg and an equal amount of cold water, flavored with 1 tsp. of lemon or vanilla. Beat until thoroughly mixed, then beat in confectioner's sugar, sifted, until the dough is stiff enough to mould. Break off pieces the size of a nutmeg, roll them in the palm of the hands until smooth and round. Press the halved walnut-meats on each side, letting the cream show slightly between the meats. One egg will require about 1¼ lb. of sugar.

Creamed Dates, Almonds, etc.

Stone the dates and shell the almonds. Make the sugar dough as directed for creamed walnuts. Put a ball of the dough into the centre of the date and cover the almonds with the dough. Creamed nut-cakes may be prepared by stirring the chopped nuts into the dough. Press it out into a flat sheet ¾ inch thick, then cut in inch squares.

Banana and Lemon-Jelly Cream.

½ box gelatine.
1 c. cold water.
1 pt. boiling water.
1 c. sugar.
¾ c. lemon juice.
1 square inch stick cinnamon.

Soak the gelatine in the cold water. Shave the lemon rind, using none of the white. Steep it with the cinnamon in the boiling water 10 m.; add the

soaked gelatine, sugar, and lemon juice, and when dissolved, strain into shallow dishes. When cold, cut it in dice or break it up with a fork, put it in a glass dish in layers with sliced bananas. Pour a cold boiled custard over them, and cover with a meringue. Brown the meringue on a plate, and slip it off over the custard.

Orange Jelly.

½ box gelatine.[1]
½ c. cold water.
1 c. boiling water.
Juice 1 lemon.
1 c. sugar.
1 pt. orange juice.

Soak the gelatine in cold water until soft. Add the boiling water, the lemon juice, sugar, and orange juice. Stir till the sugar is dissolved, then strain through fine linen into moulds or shallow pans, which have been wet in cold water.

Fruit Ice-Cream.

3 oranges.
3 lemons.
3 bananas.
½ can apricots.
3 c. sugar.
3 c. cold water.

Place a strainer over a large bowl, squeeze into it the juice of the oranges and lemons, then add the bananas and apricots, and rub them through the strainer. Add the cold water to help in the sifting. Add the sugar, and when it is dissolved, freeze the same as any ice-cream. Add from ½ c. to 1 pt. of cream if you have it, but the mixture is delicious without the cream.

[1] 2½ tbsp. granulated gelatine equals ½ box.

ALPHABETICAL INDEX.